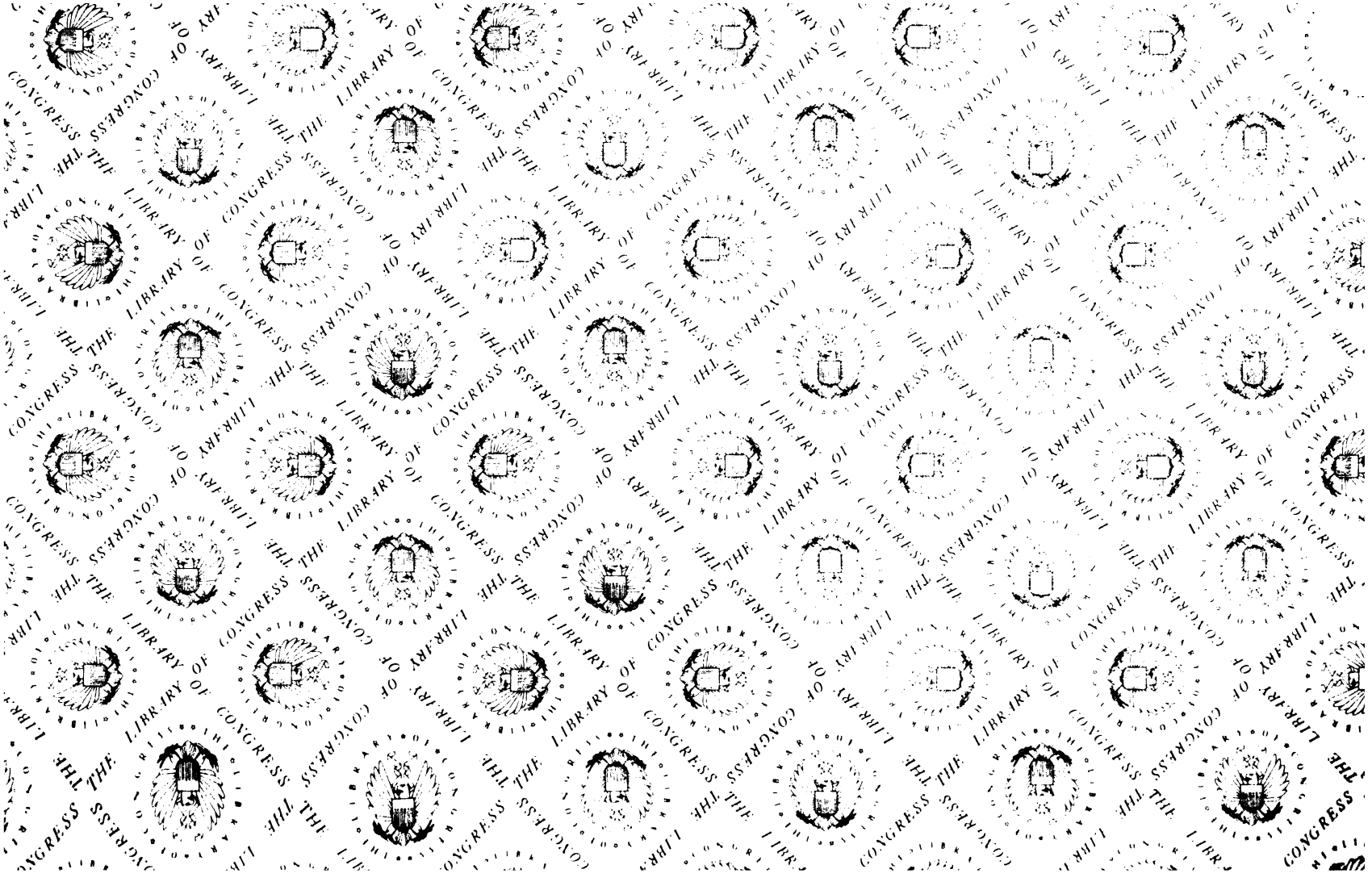
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THE

COUNTRY GENTLEMAN'S MAGAZINE

WITH ONE HUNDRED AND TWO ENGRAVINGS

VOL VII

LONDON
SIMPKIN MARSHALL & CO
EDINBURGH: JOHN MENZIES & CO. DUBLIN: M'GLASHAN & GILL
MDCCCLXXI

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CONTENTS.

GENERAL ARTICLES.

rmers *v.* Gentlemen 1
Game-Laws Offences 2
Co-operative Associations 3
Farmers and Farming 4
Irrigation 9
Early Roxburghshire Husbandry 10
The Independence of Agricultural Labourers ... 11
Custom of Chap Money 14
Editorial Note 80
The Owning and Occupying of Land in Ireland ... 81
Land Tenure 82
Gardening and Farming 86
The Education of Agricultural Pupils 87
Preserving Food in Paris 88
Australian Minced Meat 91
The Irish Land Act 145
Farmers their own Landlords 146
Management of Reaping Machines 148
Mr Mechi's Notions of Sewage 149
Illegitimacy in Scotland 150
Harvest Prospects in England 152
Mr Ruskin's Agricultural Arcadia 152
Agriculture in Ireland 209
Agricultural Associations 210
Cattle Quarantine 211
The Farmer's Position in the Country 213
Hints for the Feast of St Partridge 217
The Harvest in South Devon 219
"Too True" 221
The Scotch Salmon Fisheries 223
Do Hares and Rabbits carry Diseases to Cattle? ... 289
Treatment of Foot-and-mouth Disease 290
Modern Agriculture and the Yield of Wheat ... 293
Improved Agriculture in Ireland 295
Cultivation by Steam Power in Scotland 298
The Heads of Show Animals 301
Improved Dairy Farms in Cheshire 306
Training Young Horses how to Jump 308
The Transfer of Land 369
Virginia as a Field for Emigration 372
Freedom of Cultivation 374
Prize Farms in North Wales 377
Steam Cultivation and the Conveyance of Power ... 379
Facts about Steam and Horse Power 382
English Parks and Plantations 383

AGRICULTURAL ENGINEERING.

Old Ploughs 16
Interesting Experiment in Steam Cultivation ... 17
Howard's Steam Cultivator in Bohemia 93
Marsden's Stone-breaking Machine 154
Disintegrating Wheat Mill 155
Horse Rakes 157
New American Revolving Mould-Board Plough ... 159
Wood's New Champion Self-Delivery Reaper ... 225
Morton's Fencing 226
Broadcast Sowing Machine 228
Double-Furrow Turnwrest Plough, &c. 311
Self-acting Corn Screen 313
Fixed Engines 314
Fire Engines 315
Pooley's Automatic Grain Scales 386
Bennett's System of Steam Cultivation 387
The "Aberdeen" Manure Drill 389

THE FARM.

Imports and Exports of Agricultural Commodities 19, 95, 160, 250, 335
The Wheat Root Maggot 22
The Four-Course System 25
Flax Culture in the United Kingdom 28
Flax Growing in England and Scotland 30
Flax Culture and Food Supplies 31
Flax Culture and Manure Making 32
The Flax Crop 34
Feeding Cattle 35
Pig Breeding and Feeding 37
The Principles of Breeding Stock 38
Haymaking 40
The Spittal Irrigation Farm 43
Sewage Utilization 44
Harvesting in California 98
Farming in the Colonies 99
The Diseases of Stock 101
Sheep Shearing in Aberdeenshire 103
Steam Cultivation 104
Producing Hay for Market 163
Heavy Growth a Protection against Drought ... 165
Soiling Cattle 167
Utilization of Water for Farm Work 167
Town Sewage 170
Sheep-killing Dogs 172
The Farm Kitchen 173
Experiences of an Amateur Farmer 230
No more Guano 232
Green Food and Thick Sowing 236
Peewits and the Turnip Crop 237
Storing of Turnips 238
What is the Cause of Potato Disease? 241
Sewage Irrigation in Norfolk 242
Irrigation at Stoke Park 244, 333
Turnip Growing and the Production of Seed ... 246
Thinner Sowing and Improved Cartage 248
The Wheat Crop of 1871 317
The Storing of Root Crops 319
Manures and the Manure Trade 321
Breeding and Feeding of Stock 323
Large and Small Farms and Stock Breeding ... 327
The Potato Disease 328
Prize Farms and Farm Houses in Cheshire ... 330
Lord Leicester on Deep Cultivation in Norfolk ... 392
Harvesting Potatoes 394
The Chalking and Liming of Land 395
Reclaimed Land in Yorkshire 397
The Sewage Irrigation Farm at Banbury 399
Agricultural Notes 400

OUR LIBRARY TABLE ... ... 108, 180, 330, 409.

OCCASIONAL PAPERS.

The World before the Deluge 175
A Trip to Aldershot and Waverley Abbey 407

THE GARDEN.

Caterpillars on Fruit Trees 45
Wire Designs for Climbers 45
Flower Vase and Pedestal 47
Weed Extractors 48
Garden Engine and Water Distributor 49
Hexagonal Wire Netting 49
New and Rare Plants 50, 188, 261, 344, 414
Work in the Garden during July, 56; August, 121; September, 194; October, 265; November, 349; December 420
Setting of the Flowers of the Vine 109
The Pansy 111
Carnations and Picotees 113
Flower Culture in the Open Air 115
Amaryllis Culture 117
To Hybridize Flowers 118
Garden Plots 119
Ornamental Grasses 119
A Plea for Gardening Pursuits 182
Daisy Rake 184
Watering Apparatus 185
Garden Dibbles 186
An Extempore Fountain 186
Ornamental Conservatory 253
The Tenant's Greenhouse and Vinery 256
Sexes in Strawberries 257
Chatsworth Garden Vase 258
The Cambridge Comfortable 260
Petunia or Verbena Trellis 261
The Housing of Plants for the Winter 340
The Pentstemon 341
Fruit and Fungi 343
Everlasting Flowers and their Management ... 411

ARBORICULTURE.

The Cultivation of Trees 424

THE VETERINARIAN.

Veterinary Education 60
Bog Spavin 61
Worms in Horses 62
Bots in Cattle 63
Blood-letting 125
Knuckling, or Bent Legs in Horses 198
Improper Shoeing of Horses 269
Rational Treatment of Horses 271
Diseases of the Rumen or Paunch 274
Sidebones in Horses 276
Clinking or Forging in Horses 354
Injuries to the Coronet—Treads 356
Diseases of the Feet in Cattle and Sheep 357
Cattle Disease in Ireland 359
Poisoning of Pigs with Common Salt 428
Cure for Red Soldier in Pigs 429
Disease among Lambs 430
Murrain in Farm Animals 432

DAIRY AND POULTRY YARD.

Marketing of Dairy Products 64
Butter Factories—their Advantages 67
Milk Production of various Breeds 67
A New Cheese Factory 68
Marketing Butter 127
Profits of Cheese Factories 129
A South American Poultry-yard 130
How to Make Poultry Profitable 131
The Manipulation of Cheese 200
Un-intermittent Flow of Milk 278
Butter—Washed and Unwashed 279
A Peep at Nant 262
Training Cows to Milking 363
Pepper for Poultry 364
Poultry Farming with Profit 434

THE APIARIAN.

Hiving Bees 134
Bee Farming in 1871 436

THE NATURALIST.

Transformation of Insects 71
The Vegetable World 73
Are Parr Fish of the Salmon Tribe? 135
Insects Injurious to Vegetation ... 202, 281, 438

THE COUNTRY GENTLEWOMAN.

Horticultural Elegancies for In-door Decoration ... 77
Fresh Water Aquarium 137
Albert Smoking Bower or Summer House 139
Victoria Folding Canopy Chair 139
Rustic Hanging Basket 140
Rose Temple or Summer House 141
Rustic Jardinets 144
Ornamental Tables for a Summer House 207
The Parlour Garden 284, 365, 440
Parsnips and Salisfy, and how to Cook Them ... 443

HORÆ SYLVANÆ.

In the present Volume, one sheet of this work has appeared. The reader is recommended not to bind it up until further sheets have been contributed, so that the entire work may appear in a separate Volume.

THE

COUNTRY GENTLEMAN'S MAGAZINE

JULY 1871

FARMERS V. *GENTLEMEN.*

SOME days ago, while an officer and gentleman was examined as witness in the great Tichborne case, he said that the claimant, during his service with the carabineers, spoke and wrote like a *farmer*, and not like an English gentleman. On cross-examination, he admitted that many English gentlemen could not come *up to the mark* (I quote the words used on the occasion), but were deficient in literary attainments; so far even, I must presume, as to be ignorant of the old and simple rules belonging to the magic three R's—reading, (w)riting, and (a)rithmetic.

I was struck with the opinions uttered by the gallant witness, and so this morning I lay thinking how such things could be.

Are farmers, as a body, deficient in literary attainments, and if so, ought they to be?

On the contrary, I mean most emphatically to say that the great farming body of this country are a well-educated body. They may not have so much verbiage in constant use, but they have a sound, and in many cases, a scientific knowledge, of matters pertaining to their business, which is more than can be said of another profession—*vide* the debates on the Army Regulation Bill.

Did you ever read poetry? If so, perhaps you may have stumbled on the following: —

> "Yet he that is but able to express
> No sense at all in several languages,
> Will pass for learneder than he that's known
> To speak the strongest reason in his own."

And I don't know, after all, if mere book learning constitutes education. Very frequently the man whose knowledge has proceeded simply from reading, becomes a dealer in generalities. Memory may be the the only faculty ever used. Somebody, I don't know who, says something to this effect, that learning is the knowledge of that which is not generally known to others. Is this so? Then, I submit, farmers must have learning, because they have knowledge of many things which not generally known to others.

To be serious, however, such a heap of twaddle there is about learning and education. What men do really understand, fits, as the Americans say, into a very little space, the rest is most frequently affectation. People in towns, as a rule, endeavour to assert a sort of superiority towards farmers and country people, but this is mere conceit, for, taking the mass of towns-people, they are by no means so good judges of character, so reflective, so self-reliant, as their despised brethren. By the way, Shakspere was an *uneducated* man, and hence the *fresh*, vivid flights of his fancy, so markedly different from the scholastic texture of Milton's utterances.

Shakspere was country bred—a poacher, I believe—and hence, doubtless, the healthy, unaffected tone of his dramas, a fact, by the way, not brought forward by any of the debaters *in re* the Game-laws. I believe it is safe to back the literature of the farming in-

terest of this country against that of any other body of men, and it must not be forgotten that the literature of a body is the echo of their thoughts and sentiments. And ought not this to be? There are no men so constantly learning something new than farmers; no men so constantly alive to the kindness and yet the greatness of God; not even those who go down unto the sea in ships see greater wonders than they do, or who are more likely to be impressed thereby. Their occupation compels them to study, to reflexion, to the education of that very important portion of mankind—*self*, as otherwise, they of all men must signally fail in the discharge of their multifarious duties.

Nor are their tasks unrewarded. The sweetest poets have depicted them. They forget toil in the midst of them. Do you imagine that farmers cannot, do not, feel as Thompson did when he wrote—

> "Come, gentle Spring! ethereal mildness! come,
> And from the bosom of yon dropping cloud,
> While music wakes around, veiled in a shower
> Of shadowing roses, on our plains descend."

No! the poetry of earth is never dead, it ceases never, for ever such thoughts occur to the farmer—

> "These are thy wonders,
> Lord of Power!
> Killing and quickening
> To make us see we are but flowers that glide."

I add no more, but remain,

DUN-EDIN.

GAME-LAW OFFENCES.

IN connexion with the long talked of and much delayed legislation upon the Game-laws, which in every probability will be still further deferred, to the annoyance of everybody, and the loss of farmers where non-preservation of ground-game is the practice, a return has been issued shewing the number of convictions under the Game-laws in separate counties of England and Wales, and also the number of convictions under the Poaching Act, during the year 1870. The grand total convicted would form a nice little army. If the same daring which poachers display was regulated by discipline, we might fall back upon convicted poachers as a splendid reserve in case of a defensive war. 10,600 is the number that was summarily convicted in England and Wales; 2103 were discharged after trial; 59 were convicted for being out armed, taking game, and assaulting gamekeepers; and 36 subjected to a similar charge, were acquitted. In all 12,798.

The largest number of offenders hailed from Yorkshire, in which county 903 were found guilty of the offences charged against them, for trespassing in pursuit of game during the day time, under the Game-laws; 68 under the Poaching Act; and 63 for night-poaching and destroying game, which, with others taken up for the illegal sale of game, raised the total to 1042. Lancaster shews a total of 541, and next comes Somerset, with an aggregate of 444 cases, principally day-poaching without violence. Durham gives us 435, with four convictions for murderous assaults; Herts, 373, without any attempt at outrage; and Stafford, 340, out of which number of convictions, four were criminal. Leicester and Derby stand prominently forward for the reckless character of their poachers. In the first named county, out of a total of 307, eighteen were indicted for assault, and of these ten were convicted; in Derby, seventeen were charged with violence, but out of these, eleven managed to escape the rigour of the law. Bucks gives us 300 convicted poachers, without any attempt to do mischief to those whose duty it is to look after the preservation of the game. Chester, 356, with a like result; Devon, 343, without the keepers being attacked; Dorset, 219; Essex, 318; Gloucester, 243; Herts, 373;

Kent, 231; Lincoln, 291; and Norfolk, 237. In Northamptonshire, with 212 cases, we have one conviction for assault; in Nottingham, with 229, four convictions; in Salop, two out of 247; in Southampton, three out of 336; in Stafford, four out of 340; and in Warwick, one out of 232. In a few other counties, there were also attempted and consummated assaults; but, these are trifling compared with the convictions.

Were the hares and rabbits to be dropped out of the Game-list, we believe that poaching would speedily diminish, and that the convictions would bear a nearer proportion to the cases than they at present do, as farmers would take an interest in keeping interlopers off their land, and, at the same time, preserve sufficient animals to afford good sport to their landlords, while preventing injury to themselves.

CO-OPERATIVE ASSOCIATIONS.

By J. J. Mechi.

THIS is a free country, and a free-trade country. Every man has a right to do as he pleases, provided he obeys the laws of his country. Every one has a perfect right to buy in the cheapest and sell in the dearest market, and avoid intermediate profits. This is what I try to do in agriculture. I have a right to black my own boots, or be my own servant or porter. A peer or peeress has a right to load the elegant carriage with scrubbing-brushes and dust-pans, and the powdered and silk-stockinged Johnny with bars of soap and bags of sugar —which I not unfrequently see when I pass through the Haymarket.

It appears to me that the members of co-operative societies possess this advantage, that they can buy in such large quantities that they become wholesale purchasers, and thereby avoid the shopkeepers' profits—becoming, in fact, shopkeepers themselves, employing persons to arrange and apportion the goods to them in retail quantities; they also become their own porters and clerks, making out their own bills and carrying away their own parcels, thus saving clerks' and porters' wages. They each provide their own capital, and all is done for ready money.

If my farm were big enough, and I had the ready money, I should buy the 30 tons of guano from Messrs Bonar & Co., and so save the merchant's or agent's commission. I believe our Scotch agricultural friends do associate themselves and divide cargoes or large bulks. All this is fair and right where it can be done, although such a system is not unattended with certain difficulties and delicate considerations.

In fact, to sum up, do away with the intermediate man if he is of no use to you; sweep away the shopkeepers and intermediate men and their employés. Imagine all the shops shut up, and only a few gigantic warehouses in back streets. No more going to Regent Street to see the fashions or show there. What a saving in gas!—and how it would lighten the duties of the tax-collector and receiver of rents. What a number of ladies and gentlemen we should see with parcels under their arms. An apothecary amused me lately by describing his woes. Mr So-and-so, his customer, had just told him that he had purchased a dozen of so-and-so at the co-operative stores as cheap as the apothecary himself could have done, dividing the surplus quantity among his friends. He wanted some little matter and a little advice from the apothecary, who at once gave vent to his feelings, and in a burst of indignation referred him to the co-operative stores where he had bought by the dozen. Now, I don't believe that every shop is

going to be shut up, and that every one is going to carry home his own parcel, for the mass of people, especially of the higher and well-to-do classes, have a sense of dignity and propriety and fair play which rebels against meanness and injustice.

There is a very general impression that the Industrial Co-operative Act was intended for the artisan and humble classes, rather than for the rich, and I imagine that such was the intention, as they are free from income-tax and receipt stamps. Such persons think that they will tend to greater competition and reduced prices; but with certain exceptions the competition in trade is already very considerable, and many shopkeepers labour early and late to exist and pay rent and taxes.

But while it is admitted that co-operative stores are perfectly justifiable, there is arising a deep and angry sentiment concerning those managed by the civil servants of the Crown; and if I mistake not, it will find vent in overwhelming numbers of petitions to our Houses of Parliament. Go where I will, I hear the plaint. They say, "Here are gentlemen highly paid from the taxes of the country, and lightly worked, becoming shopkeepers and suppliers, not only for their own class, but for the general public, and although still retaining their large official salaries, also receive considerable salaries as managers of these trading institutions."

Inferences are drawn that it is impossible that they can manage these gigantic undertakings without trenching upon the public time. Some also say, that if cheapness is to be the order of the day, it must, in fair play, be carried into the civil and public service, and that their six hours a day and ten weeks' holiday in a year, should be more approximated to the hard-working and heavily-taxed trader who can scarcely spare a day's holiday from his daily drudgery of ten to fourteen hours. With the better class of traders in rich neighbourhoods, the case is somewhat different, but the two thousand four hundred grocers, and the vast number of shopkeepers in humble but densely populated districts, who pay heavy rates and taxes, look with very evil eye on the Civil Service Co-operative Stores, and dread their extension.

FARMERS AND FARMING.

By Mr L. Everett.*

Mr EVERETT said he should speak first of farmers, and then of farming generally; and in speaking of farmers, the first subject for observation which presented itself was the great variety of the men that followed that occupation. He supposed that there was no other occupation followed by men which comprised within itself a larger variety of different grades of men. There had been amongst the farming class the very highest of the land. It was said that George III. found more pleasure in his farm than he did in his kingdom. The late Prince Consort was also fond of agriculture, and was most successful in its pursuit. Then there were few of the great noblemen and landowners of this country who were not more or less practical agriculturists, and there was one who was the foremost in the agricultural world—he referred to the first Earl of Leicester. From the great noblemen downwards, among those who owned large portions of land, there were few who were not more or less connected with agriculture. Then there was the class of gentlemen agriculturists. There were numbers of gentlemen of ample means who followed the calling, not as a business, to obtain a livelihood, but as a calling in which they found a good deal of

* Paper read before the Lavenham Farmers' Club.

re, and amongst the number was some
: most intelligent and cultivated; and
of the pleasantest gentleman to be met
n this country. Then there was a large
of men—unhappily a class fast diminish-
the yeomanry, or men who farmed
own little plots of land. It was a
r of deep regret to see that class di-
hing as it was, for there was no more
endent position amongst men than to
one's own land. The time was when
of that class were the great stay of the
ry, and in some of the critical periods of
story they had taken a most distinguished

It seemed to him (Mr Everett) that
ation could prevent this state of things,
t was one of the results of the enormous
h amongst us that we saw the posses-
of the land coming into fewer hands;
in consequence, the class to which he
now referring was rapidly diminishing.
a, there was also a large class of men
were called apron-string farmers, who
to be found in the strongest numbers
id the large towns, men engaged in
s of various kinds, but who, from
ve of agriculture, tried their hands at
ng. Some of these gentlemen often
: ridiculous mistakes in the first instance,
f no injury was done to those who com-
d them, a good deal of pleasantry was
ed amongst those who witnessed them.
ngst this class of men, however, after a
in amount of experience, were to be
l some of the best and sharpest farm-
men of education; men who turned
s to the best account; and men who
got ahead of their slow-paced neigh-
s. Next came the scientific farmers, not
merous class, but an important and noisy
represented in the first rank by Mr
ii. These gentlemen benefited agricul-
but he (Mr Everett) did not think that
benefited agriculturists. They intro-
d new methods, and went ahead in
r ways, not profitable, perhaps, to follow,
which had in them the germs which, in
developed into something profitable.
ie same time, one often read with regret
statistics such gentlemen issued, being
assured that they were not corroborated by fact, and they had a misleading and injurious influence on the minds of those who read them. He now came to the largest class of all, viz., those who followed farming as a business to live by; and here there was an infinite variety, men of considerable intelligence and information, if not of the most polished manners, men who were of the old-fashioned sort, who possessed no particular knowledge of anything beyond the land on which they lived, and on which their thoughts were bound up, men whose reading was confined to their Bible and newspaper, a most worthy class of men as a whole; but there were amongst the class of business farmers, sharp practical men, acute well-read men, and who had been left somewhat behind in the progress of modern society. Last of all, there was the working farmer, an individual certainly devoutedly to be pitied; men who in reality earned less than the men they employed; men who were employed more hours than the labourer, whose earnings were not, as in the case of the working farmer, affected by the seasons, and, altogether, the position of this class of farmer was not to be envied.

THE FARMER AS AN EMPLOYER.

Leaving this branch of the subject, let them look at farmers as employers. This was a subject on which we had heard a great deal. It was often supposed that farmers were bad masters, and they had a bad name in the labour market. The position of the agricultural labourer, and the treatment meted out to him, was a very favourite subject for many to discant upon. Any one looking considerately and practically at this matter, would see that, after all, the condition of the labouring man in the villages and working on farms would contrast favourably with the unskilled labourer working in towns. Of the two, the balance of comfort, if he was a prudent man, rested with the agricultural labourer, his employment being regular, and he had advantages and privileges which his brother in the town did not possess. He (Mr Everett) was persuaded, notwithstanding all that their town friends might say, that

unskilled labourer in the town was not so well off as the unskilled labourer working on the land. Labouring men might be much better off than they were, but through faults of their own management. The waste of that class of men—though their wages would not allow of much waste—was very noticeable; those who employed their daughters knew the tendency there was to extravagance in their habits. And then there was the reckless way in which the labouring class began in their married life; so much so that if those of the middle-class followed their example, they would be reduced to their level. He contended that it was in the power of an agricultural labourer, if he gave his attention to it, to lay by a good sum by the time he was twenty-three or twenty-four years of age to enable him to furnish a cottage, take a wife, and begin life with a few pounds in hand, with the prospect, with care and frugality, of a tolerably comfortable life. An important point in the subject under discussion was that of wages. How much were the farmers to blame for not paying more? If we looked at the position of the farmer, we could see that he had no power in this matter. Comparing the earnings of the farmer himself (apart from the money he put into the business) with the earnings of the men, the men received more money out of the business than did the master. He had thought, when he had read the observations made by Canon Girdlestone, and other high personages who had spoken upon this subject, that it was all very well for those who were not farmers, and had no interest in it, to speak of practical agriculture; but if Canon Girdlestone, the numerous writers in the public papers, and those who said such hard things themselves, would take farms, and carry out in practice the payment of the higher scale of wages and continue it, the farmers would be inclined to listen to what they had to say. There was not a more thoughtful and considerate employer of labour than the farmer; and though the wages might seem small as compared with the wages paid by the commercial community, yet, on comparing what the labourer received with what the master received, it would be found that the former paid their men much nearer what he actually received than did other employers.

FARMERS AS PUBLIC MEN.

He desired next to speak of farmers as public men. There were no men in this country that were less public men than farmers, or that took less interest in public men than farmers, or that took less interest in public affairs. The gentlemen present this evening knew very well how difficult it was on any occasion, and with regard to any question, to convene a meeting of farmers in large numbers. There was a good deal of reason in it. It was, of course, very different to them to what it was with townspeople, who had lighted streets, and were accustomed to late hours, and who could meet without any inconvenience to themselves. The whole tenor of a farmer's life was to make him a quiet home-loving bird, whom it was difficult to drag out of his cage when once returned to it from his day's labour. He thought that in this matter the farmers had been much to blame. It became every man in a land like England to take some part in public affairs. Who was it that governed this country? It was the people, and no Englishman could shirk fairly and honourably the responsibility that belonged to him as a citizen and Englishman, to bear his part in public affairs. As to political questions which affected the interest of the farmers, how slow and inactive the farmers had been. Take the question of the malt-tax. Did any one imagine that if a tax like that were put upon coal or iron, or any of those productions which engaged the industry of their friends in the north of England, that they would for these seventy years or more have submitted to such a monstrous and shameful tax as that? Not only did the farmers submit to it, but actually many of the producers believed that the monstrous impost upon malt was a benefit rather than injury. Would it be possible to persuade the owner of a coal or iron mine that such a duty as that would be a benefit to him? And yet there were farmers so ignorant and inattentive to public

that they could be crammed with
uff as that. Considering the enor-
f that tax, and the length of
ıey had submitted to it, it shewed
:tle spirit there was amongst them,
:y had not made a long and vigorous
ɔ remove the burden. Let them de-
: to persevere in this matter, and lose
ɔortunity of obtaining a remission of
. This want of public spirit, however,
l to be, in some degree, diminishing;
e great progress that had been seen to
ace in reference to the formation of
ɔers of Agriculture, was, he took it, a
augury for the future. It might be
to the spread of education or the in-
in the number of newspapers, these
tending to bring farmers more on a
ıtellectually, and in activity, with those
ns, who enjoyed many privileges be-
ıey reached the farmer. He did not
any man to go in for public life.
were two extremes to be avoided.
nan was not wise who attended to
siness of the public, and neglected his
That man was also to blame who had
ıe indifference to everything going on
him, and who refused to lend his in-
: to assist in the various movements in
agriculturists were deeply interested.
present day, it was a very easy matter
l a helping hand in the different public
ɔns—viz., by means of a small sub-
ɔn in support of those organizations re-
ting the voice of the farmers, and in
:o strengthen the hands of those who
ɔ the front in these matters.

FARMERS AS POLITICIANS.

ɔproaching the last aspect of the subject,
s as politicians, he felt that he was
ıg on delicate ground, but when the
s in town were asked their opinions
ɑrmers' politics, it was well known that
ɔinion was that they were a class dis-
hed by servility to the landlord—that
ɔolitics of the owner of the soil were
, so were also the politics of the tenant.
s afraid that there was some truth in
ıat many watched the way in which the landlords voted, and they followed in the same track. Unhappily, this political servility —this thinking one way and voting another— was not confined to farmers. He was glad that the ballot was about to be introduced, which would, he thought, enable a man to give his vote without running the risk of bringing injury upon his family, and to carry out those opinions he honestly entertained. He submitted that the farmer was much to blame if he allowed himself to vote contrary to his opinions. If a man took a decided stand, he was respected; but if a man lent himself to the bidding of the men who would put the screw on the sharpest, that man was hunted up by men of both sides, and subjected to the greatest pressure. It was a most ungentlemanly and unhandsome thing for one man who held the prosperity of another man in his power, that he should use that power to make him vote contrary to his belief—it was as unworthy on his part as was the servility of the man on whom this influence was used. He did not know how it was in this part of the country, but in his part of the country the national colour of the farmer was blue, and it was a fact which sometimes caused a little cogitation in his mind. If you let him alone throughout England, he was blue without any coercion on the part of his landlord. He had lived to see Mr Disraeli Chancellor of the Exchequer two or three times since he had taken an interest in the malt-tax, and twice with a large surplus; and on one occasion, just before the Reform Bill, he could have brought in almost any budget he pleased—he was so hard up to know what to do with the money, that he began to propose paying off the National debt, and did not say a word about the malt-tax.

IMPROVEMENT IN AGRICULTURE.

Among the various occupations followed in this country, there was none that had attained a higher degree of development than that of agriculture, and he took it that they had not been behind-hand in the progress that they had made. If we compared the farmer of to-day with the farmer of a century

ago, we should find that the progress and improvement in agriculture was as patent as the progress in other comparatively more intellectual pursuits. He had been asking himself in what respect they had made improvements. He thought that where the land was well farmed there was nearly as much corn grown formerly as now. The great advance had been made in stock. While corn had got cheaper, stock had got dearer, and attention had in consequence been given to the latter, and nothing had so much altered the farmers of the present day as the introduction of various new plants, enabling them to produce more food upon their farms than did their forefathers. The question was whether their attention could not be profitably directed to the introduction of further new plants. The farmers of the present day, too, employed machinery of a superior class, there were greater facilities for feeding, by the discovery of the value of linseed and cotton-cake, and the productive powers of the land had been increased to a great extent by the introduction of chemical manures, the value of which had not yet been fully developed.

KIND OF SOIL REQUIRED.

He would next touch upon the question of soil. In looking at heavy land and light land, and the systems pursued upon them, it had struck him that a man taking light land (and assuming that his object was to make money), if he meant to keep his money together he must be very careful to keep his pocket buttoned up. He could not help thinking that high farming on light land was like pouring water into a sieve. Men might spend their money upon manures, but they would never see it again. He would advise any young man who was foolish enough to place himself upon light land, to keep his pockets buttoned up, to take what his farm would grow, and not attempt high farming, or it would soon land him in the workhouse. With heavy land the case was very different; all the improvements of late years tended to bear fruit upon heavy land. Draining had done a great deal; and as to the chemical manures, this, as he had said, was a question only in its infancy, and it struck him that in the course of a few years corn would follow corn. Putting money into heavy land, was like putting it into a good sound bank, and heavy land would bear cross-cropping for several years in succession.

PROFITABLENESS OF FARMING.

With reference to farming as an occupation, no doubt there was a great deal that was pleasant in farming. There was an amount of freedom and independence which could hardly be enjoyed in any other calling. There was a natural pleasure in cultivating a piece of land, which was felt by most men, especially any one connected with land in youth. We saw flowers in the windows of cottages in the darkest streets and lanes of our great cities. Farming was an occupation that was good and exceedingly pleasant for a man to follow who was independent of his farm, and one sometimes exceedingly unpleasant to the man who was dependent upon what he could get from it for his existence. He should not like to give an opinion as to what were the profits of a farm. The Chancellor of the Exchequer assumed that the farmer's income was half his rent and his tithe added together. He (Mr Everett) thought they might take that as a fair data as to what the profits of the farm ought to be, and as to whether the profits of the farmers were that, it seemed to be a question of rent. Mr Goschen thought the profits of the farmer under Schedule B had not declined, and that no one could say that farmers' incomes were less than formerly. If a farmer could get what the Chancellor of the Exchequer assumed to be his income, it would be found to be about ten per cent. on his capital; five per cent. for his money, and five per cent. for himself. If he had 250 acres, employing £2500, there would be £125 for interest of his money, and £125 for himself, and including the tithe he would have about £150 as the reward of his labour. Considering the intelligence and attention that were required to make use of that money, that was about as miserable an occupation as a man could follow. He would say to the young man who

was thinking about going into farming, that if he felt he had a capacity to grapple with other men, if he felt he was able to hold his own amongst his fellows in the struggle of life, by no means let him become a farmer. You never knew a farmer to become very rich out of his business; if he had money, it was because he began with money, or had money left to the farm. He was afraid it was not in the power of anybody to gain a large fortune in the business. There was one other matter he must not pass by, and that was the question of rent. He had said that there was a profit of 10 per cent. if a man paid a fair rent. Some had said that rent had nothing to do with farming. He did not believe any such thing. In his eagerness to obtain a farm, a man was not so careful of his rent as he ought to be. The position of a landlord, and a man who had to set rent, was a very delicate one. When a man went to a landlord, or an agent, and said he was willing to give so-and-so for the farm, and it was more than had been given before, it was of course difficult to withstand the temptation. His advice was not to pay too much rent—it was much better not to have farms than to pay too much rent.

IRRIGATION.

THE insufficiency of water which has so often been felt in this country, and about which for years we have had deplorations from farmers, and warnings and advices from engineers engaged in agricultural operations, is being experienced in the United States, or at least in the eastern portion of them.

That we waste our water, is a well known fact. We say *waste*, and we believe the word is correct, in so far that we do not *conserve* it at such times as we have an overplus. The invigorating fluid is allowed to run away anywhere over places indeed, such as light lands on the hill-sides, where its operation, instead of being beneficial as it might be, is in the highest degree detrimental, because it washes out the young plants in its course, and buries the others on the level, under the *debris* of the uprooted ones, with the soil in which they were rooted. We have often seen, after a heavy fall of rain, the soil entirely carried from the summit of a slope and along with it the seeds therein sown, to the ruin of the land below, when an easy arrangement at the top would have secured a portion of water for necessitious times, and prevented immediate harm to land and crop.

It is to be hoped that the views which have been so ably propagated by Mr Bailey Denton, and others, with reference to the imperative neccessity of storing up water when it falls super-abundantly, will be adopted and acted upon; and it is likewise heartily to be wished that agriculturists by resorting to irrigation will further put themselves out of the way of ruination by drought. There are irrigation schemes now at their command which have been very well tested and not found wanting. By their aid, that capricious personage "the Clerk of the Weather," might be set at defiance so far as moisture is concerned. According to *Hearth and Home*, the want of rain has materially injured if not destroyed the hay crops in the Eastern States of America. "With no efficient system of using brook water to irrigate their land (continues our contemporary), the farmers are entirely dependent upon the skies for moisture for their crops. The Long Island farmers say that the warm sun, cold nights, and want of rain, have about completed the ruin of their crops of hay. It is estimated that the damage to the farming community of Long Island from the present drought, cannot fall short of one million dollars. The damage to the New

England farmers from the same source cannot easily be computed. In those sections of the country where the year is divided into the wet and the dry season, it would be impossible to raise any crops if the land was not irrigated. Eastern farmers have of late years suffered so much from lack of rain that many of them are wisely determining to make permanent provision for irrigating their fields through the entire season, so that they will not in future be disastrously affected by the want of rain and showers."

We have over and over again urged the advantages of irrigation, but our advice has as yet been acted upon only on a very limited scale. Just such an amount of honour has been given as that which has been accorded to a prophet in his own country. Perhaps the advice from across the Atlantic we have quoted, will be more relished by farmers. If they reject all exhortations of the kind, they alone will be the sufferers. The sunken cart-wheel could not be got out of the rut by plaintive appeals to Jove, in antient times, without the assistance of the sturdy shoulder of the plaintiff. Providence, in these days, helps only those who help themselves. There is always water to be commanded with a little forethought, labour, and cost; if these are not employed, there is little just cause of complaint about the inauspiciousness of the season.

EARLY ROXBURGHSHIRE HUSBRANDY.

WE are indebted to an esteemed correspondent, whose pen has frequently enriched our pages, for the following interesting communication:—

At a meeting held lately in Kelso, Roxburghshire, a very interesting discussion took place on the best method of feeding cattle accustomed to turnips, in the event of scarcity of such food. Mr John Usher, of Stodrig, made some useful remarks on this very important subject, respecting which it may not be uninteresting to your readers to say something relating to the first introduction of turnip husbandry in Roxburghshire. About the year 1750, Mr Cockburn, of Ormiston, in East Lothian, began the cultivation of turnips in his fields, and the celebrated Lord Kames tried the same experiment in Berwickshire, but they met with little success, and the farmers in Scotland paid little attention at that time to any novelties in agriculture. It was not until 1753, when William Dawson, son of a farmer in Roxburghshire, returned from England, where, after receiving a very liberal education, he had been sent so as to obtain a knowledge of the best husbandry, that this novelty was carried into practical form. He had resided for some years in the West Riding of Yorkshire, and also in Essex, working as an ordinary farm-servant, and so acquired peculiar excellence as a ploughman. He took a farm, paying for it what was then thought a full rent, and began his operations, which were regarded as visionary. He was looked on as a rash young man, who, in his vanity, desired to import foreign notions, and every practical farmer predicted his ruin.

On the success or failure of this innovator, the fate, for many years to come, of Scottish agriculture depended. In these times, when so much is heard of the supremacy of Scottish farmers, it is but fair to admit that Mr Dawson, who lived to hear himself called "The Father of Agriculture in Scotland," learned his first lessons therein from the under-estimated farmers of old England.

Mr Dawson's first course of proceedure was to bring his lands into condition by planting turnips in drills, by the use of artificial grasses, then also unknown in Scotland, by the liberal use of lime, so as to bring the land advantageously into grass. He had in view

ort upon his farm a great number of nd by their means to cause a mode- ›portion of the soil to give forth a rop of grain than formerly the whole lded.

difficulties attendant upon the execu- such views were very great, and can r be appreciated now. He had to , as it were, the agriculture of one to another, this of itself requiring ıct and discernment; but, above all, he imself in the position of an eminent an who had to educate his party, in- as he had to educate his ploughmen. ion only exists among equals, and he hat his superiority in this branch of of agriculture excited no such feeling them. He took pains to train one man, illustrative of the truth above stated, his :rvants became jealous, an eager desire l soon began to appear, and speedily ıd himself surrounded by workmen r inferior to himself.

ıtime, his neighbours looked coldly on, vas not until the fields of Mr Dawson o look more beautiful and fertile than vn, that they also discovered another nt fact—viz., that he was becoming a n. Scotsmen, as a nation, are neither rs nor innovators; but the stern logic , when "siller" is concerned, seems to open up the pent up fountain of their energies, repressed by their habitual caution. Now, those who derided were eager to follow. From every quarter of the country Mr Dawson's ploughmen were in request. East Lothian and Angus made rapid strides; and Roxburgh, not to be left behind, became the scene of the most active agricultural enterprises. The farmers of this lovely county, so full of romantic and historic interest, now, in part, pay back their debt to England, by presenting to the notice of their brethren here, the results of their experience—and no unenlightened one it is now—in the art, knowledge of which was acquired by the son of a Roxburghshire farmer in England.

It is perhaps not generally known that Dr Hutton, famous for his theory of the Foundation and Structure of the Globe, and who possessed lands in Berwickshire, not satisfied with the condition of husbandry there, went to Norfolk, and after residing there for some time, prevailed on a Norfolk ploughman to accompany him to that terror of all Englishmen—The North, and there he introduced the system prevalent in that county, to the admiration and subsequent profit of the Berwickshire farmers.

Scotland owes much to England in agriculture, and nobly she is shewing her appreciation of the benefits received.

HE INDEPENDENCE OF AGRICULTURAL LABOURERS.

TELY, Sir Edward Kerrison invited the agricultural labourers of Eye, , Denham, Brome, and Oakley, in , to discuss the desirability of inaugu- a society to increase and develop r and self-reliance in their ranks.

objects of the society are thus ex- . in the preface to the rules:—

o encourage the sons of labourers to ıbits of thriftiness at an early age, by g them to insure a sum of money for st start in life, by small quarterly pay-

2. To supply a great need, which benefit societies have failed satisfactorily to secure, viz., a provision for men of sixty, for the rest of their lives.

Under the arrangements set forth in the rules, an allowance after attaining the age of sixty can be secured by a small quarterly payment, within the means of any labourer in the parishes of Eye, Hoxne, Brome, Oakley, and Denham. The society also becomes a kind of savings' bank, for in the event of the death of a member before he has received the benefits of he

membership, or under any extraordinary circumstances in his lifetime, the money subscribed by him, with an addition (made at the option of the committee) will in all cases be returned.

Sir Edward said:—I have come here for the purpose which is stated on the bill which has been sent about to the different parishes —to consult with you as to whether it is desirable, or not desirable, to form another benefit society. The first thing I have to shew you is this—I have to shew, if I am able, the necessity for establishing another benefit society; and when I have shewn you that, then to shew you the means which I think will best promote it. I take it, that all over England, at this very moment, the one thought amongst those who think at all, is—what is to be done with the vast amount of unemployed labour in the large towns? People do not know how to deal with pauperism in those great towns; and it will continue until some means shall be devised to employ the labour which is now unemployed, and to make it productive. The stream of labour will continue to flow into the towns. As the poet says:—

> "Men may come, and men may go,
> But I flow on for ever."

Yes, like a great river, that stream will go on flowing into the towns where it is necessary it should be employed. But, my friends, I want to bring you nearer home. We must look to see whether for this great evil of pauperism—which exists all over England—there are not some means of allaying it within our own neighbourhood, whether there are not some means for us who are in the habit of saying, "These rates are growing, we must get some one to pay them," or reduce them ourselves. In the Hartismere Union, of which I am now speaking, in the year 1850, the cost was £8493 for the general purposes of the poor-law. In 1870, we were paying £8563, or £70 more than we did twenty years ago. Well, the remarkable part of this statement is to come. In this twenty years we have reduced the population by 2000 and odd people. We have increased the natural population—or our population has increased in the same ratio as in other places, that is to say, by 2444, but that 2444 have thought it best to go places where they may get more money for their labour. Here we are, then; in these twenty years we have lost 2000 in this union, and we pay £70 more for our rates. Now, there must be something wrong in this. Is it that you have less work? No. I happen to be a very constant attendant at the poor-law board here now, and to know how you are employed. Then, have you been improvident? No. Since I can recollect, and even within twenty years, a vast number of benefit clubs have arisen amongst you. Now, I think, in the first instance, there is an evil in the management of the poor-rate itself. I think the system is wrong which administers through officials that which really ought to be the genuine effort of the ratepayers themselves—that is in itself wrong. Now, I want to shew you, labourers, how intimately you are connected with this. You who receive relief as paupers may make no attempt to benefit yourselves, or to lessen the poor-rate. You may look upon the poor-law only as a means by which you obtain relief; but the vast majority of you, I know, look upon it in the same way as I do myself. You are as large ratepayers, in proportion, as I am. Take your cottages of £3 average rent—as to my own cottages, which let at an average of £3, I pay the rates—but I will take the rates upon a £4 cottage in Eye, as an example. The rates paid by myself, on a composition, are 5s. annually; if they were paid by you, without composition, they would amount to 7s. annually; so that for these cottages in this town, as well as in the neighbouring parishes, you, my friends, who perhaps may be on the pauper list, have to contribute your share, and therefore I tell you that it is your interest to diminish that 7s. which I have put for argument sake, as it is for me to diminish my 5s. It is for this reason that I want particularly to impress upon you that we have all one interest in the matter of reducing the amount of money paid through the poor-rate —and not only, my friends, in the interest of

economy, but also in the interest of independence. I have said that the fault of the poor-law administration is, that it is an administration through officials. I ask you what can one man—however clever, however good, however full of sympathy and kindness he may be—how is that one man to represent the wants and requirements of 10,000 people?—which is about the number that some relieving officers have to attend to, for the board of guardians. What is the course pursued at the board of guardians? Some of the guardians are present and some are absent, but even if they are present, how much do they usually know of the wants of the people applying for relief? The opinion of the relieving officer is usually taken, and perhaps he may know, or he may have known, a week before about the people applying for relief. But there are circumstances in the lives of poor men which require constant looking into. What do you do yourselves? You have friendly and benefit societies, and by which you pay 10s., or more or less, to your sick members. Do you rely upon officials and upon official returns? No, you send people to ask about the condition of those who are in receipt of your money. All I say is, carry this practice into the poor-law work, and if you do you will diminish the rates and increase the comforts of the working men. Now, my friends, there may be another reason why the rates have risen to a considerable extent, and that is, that while a number of people have left this neighbourhood, it is the younger men who have so left, and they have left behind the old people, those who are sickly and not able to go away, and consequently they have remained with us; they have been more frequently in need of assistance, and necessarily they have caused a heavier charge upon the rates. Now, the question is, is there no means of relieving such old people? I have watched with the greatest possible interest all your exertions on behalf of your friendly societies. When I find the Mayor of Blackburn saying, in 1859, of the cotton operatives, that he believed every man, woman, and child earning 10s. 6d. per head per week, ought to be able to maintain themselves, not only in sickness, but in old age, without assistance from anybody, it is singularly to the credit of the agricultural community that in their large towns the rate of deposit in savings banks for the future good of the depositor is exactly equal to theirs. I will give you a few instances of this. In Wallingford, Cirencester, Gloucester, Hereford, and Leominster, towns with an average of 20,000 inhabitants each, and agricultural towns, the average amount of the money laid up by the poor was £27 per head, and one in eleven of the population contributed. In Manchester, Stockport, Salford, Oldham, and Warrington, towns with an average of 105,000 inhabitants, the deposits were the same, only £27 each, or the same as in the agricultural districts. That fact is wonderfully to the credit of the agricultural community. In Bradford, the number of depositors was only one in twenty-four, in comparison with the ordinary number of depositors in the agricultural districts, one in twelve. But while you have worked hard in the agricultural districts to raise money for yourselves in sickness, I cannot see where the money is to come from for old age. Having said so much, I will proceed at once to shew you what my views are, and how they may be best carried out. I shall ask no opinion of you to-night; I shall hurry no one, but shall merely read the rules for your consideration. After that I shall ask Mr Woolnough to place in your hands printed copies, and then you will be able to ask of your friends whether what I advance is not for your interest. Sir Edward then read the first of the objects of the society as set forth in his preface, and said he had confined the operations of the society to the five parishes, because he had the principal part of his property there. But he must distinctly say that he felt precisely as much bound to any other parish in which he had property as to those five parishes. He should ask the owners in other parishes, where his interest was not so large, to ask the other owners to met him before he could aid them. His object was not to interfere with the other benefit societies, but

merely to supplement them, and in fixing the contribution at 5s. a-year, he wished them to remember that they now paid that in rates to keep people who unfortunately were not able to keep themselves. As to the annuity at sixty years of age, no other body that he was aware of gave annuities at such a low rate, and the members who died before that age could have money drawn out for their friends. Mr Francis Woolnough was to be the secretary; because he was the man who, in that neighbourhood, knew most about friendly societies. He had appointed himself president, and in the event of his death he had asked his nephew, Lord Henniker, who was equally interested with himself in the welfare of the poor, to succeed him. Further than that he had not gone, but he left the working men to work the Club. It would be for them to form a committee, and there would be no one else but the members and himself, and if they thought fit to out-vote their president they could always do it. The result of their joining would be, to the young who joined at twelve or thirteen years of age, an annuity of 8s. 4d. a-month at sixty years of age. That was not much, but when they came to think that an aged couple received but 2s. 6d. from the board of guardians, they would see that 2s. 1d. would do much to assist them in their old age. The object of reducing the annuity to those who joined later in life, was to get the younger portion of the labourers to embark in the society at once. In order to increase the amount which they received, he was willing to invest £1000. That would be the means of adding 4s. to 5s. a-year to what the members would pay. They had not resorted to an actuary, but had based their calculations in the simplest possible way on the Government tables. They might have a feast once a year, as any other society had, and he begged of those present to examine the scheme and see if it was not worth adopting. At the end of a month they might apply to Mr Woolnough, and he (Sir Edward) would also try to meet them and set to work to form the society. All he could say was that he had but one object, and that was to raise the labourers socially in that neighbourhood. If he lived a long time, or a short time, it mattered not at all, if he could die thinking and believing he had done something to relieve and aid the poor in that neighbourhood.

CUSTOM OF CHAP MONEY.

AT the last meeting of the Banbury Chamber of Agriculture, Mr W. Miller read a paper on the above subject. After referring to its origin, he alluded, in the following terms, to its obnoxious nature :—

I will just explain to you, as near as I can, the amount of custom or chap money we are annually paying on corn and live stock, &c., in England, in accordance with the rules of Banbury. I name Banbury, because the greatest portion of us who attend this meeting sell most of our corn and stock in Banbury, therefore we are subject to the rules of that market. I will just give you the acreage of the different corn crops grown in England for the past year, 1870; the quantity of corn supposed to be grown per acre, and the amount of custom or chap money that would be paid on each kind of grain, suppose it was all sold in Banbury market. I will first take wheat. The amount grown last year was 3,247,973 acres, the average yield supposed to be 3½ qrs. per acre, that will amount to 11,367,905 qrs. Banbury custom, 1s. on 5 qrs., amounts to £113,679, 1s. Then take barley : 1,963,744 acres at 4 qrs. per acre, is 7,454,976 qrs. Custom, 1s. on 5 qrs., amounts to £74,549, 15s. Oats, 1,490,647 acres, at 6 qrs. per acre, is 8,943,882 qrs. Custom, 1s. on 5 qrs., is £89,438, 16s. Rye, 52,700 acres, at 3½ qrs. per acre, is 184,481 qrs. Custom, 1s. on 5

£18,448. Beans, 503,520 acres at 3½ er acre, is 1,762.320 qrs. Custom, 1s. qrs., £17,623. Peas, 311,543 acres, at per acre, 1,246,172 qrs. Custom, 1s. qrs., is £12,461, 14s. Total custom or money on corn, £326,200, 6s. Beasts, quantity of stock kept last year was, ,134; chap money, 1s. each, £187,856, Sheep, 18,940,256, taking 20 sheep for pen—I think that would be a fair aver- or Banbury, I believe there would be as pens under 20 as above, and more par- rly now, as a great many are sold by on in pens of 5—the chap money e sheep, 1s. each pen, is £47,350, 2s. es, 977,707; this number of horses hat is kept and returned only by griculturists, 1s. on each, chap money, 885, 7s. Pigs, 1,813,901, at 6 in a the chap money being 1s. per pen, 115, 16s.

annot ascertain that any market or fair ngland, where corn and cattle are sold, a heavier amount of custom or chap y than we do at Banbury. But I could n you of a great many places where they ess. I will name a few of them. Take nstance Didcot; they pay 1s. on 10 ers of all kinds of grain; that is just what we pay at Banbury. Then take y, the custom is 1s. on 10 qrs. of corn, 1s. on the deal for beasts, whether few any, not as it is at Banbury, 1s. for beast. At Guildford, there is rather a lar custom. One individual rents the exchange, or where the market is held, e corporation, and three-fourths of the is sold by commission, charging 3s. per for selling, unloading, and housing, so never give chap money to the buyer. end of mine sold his corn on those tions for twelve years. I took a letter a paper as far back as December 23, as a reply to a correspondent who l for information on the subject of chap y, which letter ran thus:—"I can in- you that at Uxbridge, which has long celebrated as one of the best wheat ets in the kingdom, this very objection- impost has for many years been abolished by the mutual consent of both buyers and sellers." The letter goes on to say:—In Windsor market it has also been discontinued, except by two firms, one a large mealing firm, the other a malting and brewing business. A friend told me he bought 14 beasts at Blackwater fair some time ago. When he paid for them, the gentleman gave him 1s. and treated him with a glass; he complained, and said he thought he was entitled to more chap money. Chap money! he said, they did not give chap money, it was quite optional whether they gave the shilling. I could quote many more different customs, but I will confine myself to one more market—that is, London—I may say the A-1 market of the world, as a great deal of the produce of foreign countries is delivered and sold in London, and it is also the ruling and guiding market for corn and meat in England, but you don't hear of such a thing as custom or chap money being given there, neither on foreign nor English produce of any description. Then, as London is our principal guide in prices for corn, meat, and stock, let it be our guide also as regards custom or chap money. If they don't give any in London, why should we give any in Banbury? Again, at a great many markets and fairs in England, there is a large portion of our live stock sold by auction, and a great many monthly auction sales established on the different lines of railway for that purpose. Also, you frequently hear of gentlemen and farmers having extra stock sales on their premises, and sales of farming stock are taking place in England daily, but can any one inform me if ever he saw or heard of an auctioneer giving chap money? I may say no. He concluded by moving a resolution to the effect that on and after the 1st day of June 1871, all chap or custom money shall cease to be paid in Banbury, and in its respective corn, cattle, sheep, and pig markets, on all kinds of grain or cattle, bought or sold, such as wheat, barley, oats, beans, peas, rye, vetches, &c.; also on horses, cows, and all kinds of horned beasts whatever, sheep and pigs. The resolution was unanimously agreed to.

Agricultural Engineering

OLD PLOUGHS.

THE double-furrow plough, about which . for a long time there was so much eatened, ending in actual litigation, and he triumph of Messrs Fowler, with Pirie's ent over all other manufacturers and forms manufacture, it appears, is by no means iew idea. In the time of Cromwell, we l from an old book kindly lent us by Mr rland, of Sawdon Hall, Brompton, York- e, Walter Blith, the author, in chapter "holds forth a description of a double ugh carrying two furrows at once, and h proportionable to a furrow, one ordinary ugh shall carry with a plough that shall h plough and harrow at the same time." e description of the plough, of which iute details are given, may be passed over, i the general remark, that from the en- ving we have, the implement appears to like two ordinary ploughs fixed together cramps, the foremost having a beam ger than the other, and the space left be- en the ploughshares, the width of a ow, the same as on the modern ble invention. There are no wheels n it, but in other sketches of single ughs, we find these draught lighteners ched. Having laid down instructions r to construct such a plough, the author ceeds to say that with this implement ou may well plough upon ordinary arable l that is in good tillage, a double propor- , and also upon fair clean lea turf, and you may manage with two men and four d horses, but not either upon strong l or rough land. The description and ourse whereof I give not in as of any it advantage above the other plain igh, but for variety sake, and to pre- e others to the amendment and perfect- of this discovery; yet I for the present see not, but it may be of excellent use and expedition upon many lands in England." The plough that also harrowed by itself seems to have belonged specially to Norfolk, and even there it does not appear to have been general, but it was used in several places in that county. Mr Blith does not appear to have been quite confident as to its utility. "Casting about with myself," he remarks, "the advantages, and disadvantages also, and finding not how it will so well suite with our common wayes of husbandry, as to be a generall advantage, shall say the less, only tell you the manner of it." In describing the combined implement, he tells us that the plough and the harrow are both light, that the latter is fixed to one end of the beam of the former, so that as the plough turns, the harrow turns also; and he continues, "as the plough turns one furrow, the harrow harrows it over, reaching two more furrows, and so, by the over-reaching, it strikes two or three times in one place which is sufficient for the covering any corn whatsoever shall be sown upon Norfolk lands; but finding these two prejudices against it—viz., either this land must be sowed as the land is ploughed, and so it will take up a man's time sowing an acre, when otherwise a man will sow 9 or 10 acres of one day, or else it must be sowed before ploughing, and then it must be ploughed in and harrowed upon the top of it, which falls not under my experience, having known much land fall for the heavier and more subject to bind and bury, than if only lightly covered with the plough and laid more open." The ingenious Mr Blith, however, had in his mind's eye a method for saving the time of the sower, but whether he ever succeeded we are not aware. It was to attach a drill to the plough as well

as a harrow, and thus do away with the man sowing after the ploughman. Another addition, he says, may be made thereto, "which is how to drop the corn, corn by corn proportionably to that quantity I desire to sow upon an acre, which if I can experimentally make out, I fear not to give you plough, and harrow, and seedsman (that is, drill) all at once, and all to work with two horses and one man upon some lands, and with three horses upon all of this nature (pretty heavy and, we presume), and all to be done almost within the same compass of time that you are upon the ploughing of it; it shall not require one hour in the day more; which, if I shall accomplish, you shall save three parts of your seed also, and considerable labour, and not fail to have a better crop."

It thus appears that the germ of improvements in implements introduced within the last twenty-five years, and in modern farming was planted more than two centuries ago.

INTERESTING EXPERIMENT IN STEAM CULTIVATION.

THE *Midland Counties Herald* reports an interesting experiment in steam cultivation, made by Mr J. R. M'Lean, M.P., of Cannock Chase. The tract of land upon which the steam apparatus was set to work belongs to the Cannock Chase Colliery Company, and is about 2000 acres in extent. It was thought by Mr M'Lean that such a large surface should not be allowed to lie unproductive, notwithstanding that it was of a somewhat unpromising character, and as nothing but steam could thoroughly disintegrate it, it was resolved that steam should be applied. Mr M'Lean, apparently, is not a man to do anything by halves, so he engaged, from the Staffordshire Steam Ploughing Company, no fewer than eight engines of from 10 to 14-horse power each, with the necessary complement of ploughs, some taking five and others three furrows each, cultivators and harrows, and with *double* diggers—an implement manufactured specially for the kind of work necessary in the colliery region. The direct action, or what may be called Fowler's system of steam cultivation, is pursued.

The soil may be described generally as of a black peaty character, overtopping a poor gravelly subsoil. But in places there is strong land, and parts are quite boggy, by no means a promising subject, to appearance, for raising crops.

On invitation from Mr M'Lean, a large number of the members of the Midland Farmers' Club lately, inspected the work which has been performed in this heretofore wilderness during the present season According to our contemporary, "The first plot inspected had been worked with the double digger, the chief peculiarity of which is, that the share which takes off the surface is placed last instead of first. By this arrange ment, on the return journey or second bout, the 3 inches of surface pared off, with the heather, fern, and bilberry roots, are passed over by the wide heavy wheel with a pressure of about 2 tons, and this valuable vegetable matter is then covered with 8 to 9 inches of the subsoil. The chief obstacle to the process is the bilbery plant, which grows in patches in most parts of the Chase, and to remove which various methods have been tried—a rotary disc in advance of the ploughshare being most efficacious. As this, however, retards progress where the land is free from bilberry roots, it has been found more economical in practice to have this obstacle cleared away by labourers before the soil is cultivated. The second plot being tolerably free from heather, &c., on the surface, had been twice cultivated, or scuffled, instead of being ploughed, and then harrowed four or five times; the intention being to plant rape or turnip shortly, as was also

the next plot, which, from the fact of its being found in small high-backed lands, about 4 feet across, and tolerably free from heather, no doubt had in former years—perhaps during the last century—been under culture. It was originally intended to have put this in oats; but the weather interfered, and the land was not quite ready for sowing in time. The fourth plot was untouched until the first week in April, when it was double dug, then harrowed and manured, and planted with potatoes. The sorts used were white rocks and red regents; the breadth planted with these being about 130 acres, which received a dressing of 8½ cwt. of potato manure, and 2 cwt. of salt per acre; and it is intended to apply about 50 cwt. of lime per acre, and harrow the same in, previous to moulding up the potatoes. The next plot had been cultivated until two or three years ago. In the interval, it had lain waste, and was a mass of couch grass, several hundred loads of which had been brought to the surface with the cultivator, collected, and burnt, but yet much remained to be disposed of. The portion in oats was the last walked over. This had been ploughed in the autumn, 6 inches deep, with the 4-furrow plough; and although the oats were not sown until May 9th, there is every probability of a fair crop—at least of straw."

Many waste grounds might be reclaimed after the same fashion that the Cannock Chase is being brought under cultivation, if the same energy and capital were supplied. We have seen lands in Renfrewshire of a like nature to those here described, that were utterly unproductive, except for peat and heather, the one for burning, and the other for making besoms (we do not think the ground ever sheltered grouse or moor fowl of any kind to an extent sufficient to afford amusement to the sportsman) under the a management of the late Secretary of the Hi land and Agricultural Society, Mr Hall M well, yield splendid crops of potatoes and oats. Hundreds of thousands of acres o like kind are still adding nothing to the f of man, and affording no labour to ha that are willing to work. We approve emigration only in a modified deg We have never done otherwise. Wl there is no field for labour in t country, in any particular department, recognize with pleasure the efforts made the philanthropic to secure for the inc trious a place in other lands where t services are needed and will be properly munerated. But we do not like to cargo after cargo of the best of the tillers the soil leaving our shores when there plenty of land to cultivate at home. M'Lean has set an example which we t will be followed by others who are in possession of land similar to that which he just broken up. Steam is the motive pov but it must be guided by men; and m after the operation of the insensate fo must be employed in the planting, cleaning, and gathering of the crops. cannot go so far as Captain Maxse with ference to the improvement of waste lan indeed we have had to say before, what think still, that a great deal he has utte on the subject is sheer nonsense; but agree with Mr. Brawn, who spoke after luncheon which followed the inspection Cannock Chase, that the reclamation of *claimable* tracts of waste land is a matte great national importance, and that it is m desirable to employ such surplus agricult labour as we have on hand in cultiva these virgin fields, than to encourage it to across the seas.

The Farm.

'ORTS AND EXPORTS OF AGRICULTURAL COMMODITIES.

P to the end of last month we have this year had from abroad £766,026 of live cattle, distinguished in the : and Navigation Accounts as oxen and The number of animals were 45,282, gainst 40,844 in 1870, which cost ',528, so that, in round numbers, the during the five months this year is £1 less than last, £17 a-head to com- with £17, 19s. During the month of we received 2000 more than in May —13,100, against 11,046. Alike on ıonth and five months there was a large ıse in cows, the number landed during being 5211, in 1870 only 1292, and in ve months 11,280 and 5042 respectively. ;ums paid bore a commensurate propor- o the numbers received. The supply of s was shorter, both on the month and nonths. The falling off belonging par- rly to foregoing months. At the end e fifth month we had this year paid 417 ; in 1870, our account at the same amounted to £36,932.

ɜ had a much larger supply of sheep g last month than we had either in 1870 69. In the month, the restrictions hav- ɔeen removed, we imported no fewer 124,515, a-half more than we purchased ɜ corresponding month of last year, and nearly half as many as we received in oregoing months of the present. The was dearer this year, being £232,207 ɔmpare with £130,118 last. Of swine ıad about 700 more on the month, the ɔers being respectively 8968 and 9678; ıe five months we had a decrease of y 8000, and on the five months a decline lue of £36,780.

ır supplies of bacon were much less on ıonth, but on the five we had a consider able increase, the figures being £1,167,769 to compare with £908,673 in the like period of last year. Beef, also, we are getting in larger supplies, both in a salted and fresh state, and we are paying dearer for it than we did last year. The total sum we expended, up to the month of May this year, was £416,655, in the like period of 1870, £180,819.

Of butter, we received in the month 106,270 cwts. as against 83,666 cwts. in the corresponding month of the previous year; and in the five months past we have expended no less a sum than £2,673,525 upon this article. For cheese, during the same period, we have paid away £804,802, making a total of nearly £3,500,000 sterling for dairy produce, or, on a rough and ready estimate, about £8,000,000 a-year. We surely might do better than this. It is admitted on all hands that our country is admirably, nay, specially adapted for the raising of cattle. We have the finest breeds in the world, alike for fattening and milking—we are, in fact, the world's emporium for the best of stock—and yet we have to import so much dairy produce! Surely it might be so arranged that a considerable proportion of this sum should be retained in our own pockets.

Alike on the month and five months we had a much larger supply of hams from abroad, which indicates that this country is, notwithstanding the foreign war, in a prosperous condition. The amount of money paid during the five months for ham, was £83,188 as against £53,735 in the like term of last year. To eat along with this ham, we imported in the five months 1,420,856 great hundreds of eggs, less in quantity by nearly a quarter of a-

million than in the same period of last year, but the sum we paid for them was much higher, £522,836 to compare with £496,695.

In the course of the present year—up to the end of May, we mean—we have imported about 400,000 cwts. of wheat more than in the same term of 1870, the total quantities being respectively 12,299,707 cwts. and 11,898,825. The values were dearer this year in proportion, being £7,249,089, to contrast with £5,708,832. Of barley, oats, and peas, we imported less in the five months, more of beans, and less of Indian corn, although it will be seen from the statistics below, that we had more barley and maize in the course of last month. The following table shews the precise imports for the month, with the values, and in the case of wheat, whence they were derived :—

QUANTITIES.

Wheat.	Month ended May 31, 1870. Cwt.	Month ended May 31, 1871. Cwt.
Russia	348,745	647,296
Denmark	104,110	5,066
Germany	660,809	449,131
France	3,306	9,800
Austrian Territories	242	71,735
Turkey, Wallachia, and Moldavia	18,131	93,620
Egypt	223	2,600
United States	1,308,819	858,792
Chili	16,208	20,295
British North America	106,309	213,217
Other Countries	3,553	34,769
Total	2,570,455	2,406,321

VALUE.

Russia	£159,841	£370,533
Denmark	49,452	3,246
Germany	363,040	297,582
France	1,681	5,400
Austrian Territories	118	45,833
Turkey, Wallachia, and Moldavia	7,809	48,405
Egypt	103	1,400
United States	685,647	506,687
Chili	9,185	13,686
British North America	53,155	120,083
Other Countries	1,689	21,748
Total	£1,331,720	£1,434,603

QUANTITIES.

	Month ended May 31, 1870. Cwt.	Month ended May 31, 1871. Cwt.
Barley	652,479	677,507
Oats	1,257,520	905,567
Peas	297,697	176,776
Beans	122,821	213,840
Indian corn	764,144	815,450

VALUE.

Barley	£265,212	£282,807
Oats	460,977	364,804
Peas	116,366	81,037
Beans	51,300	100,602
Indian corn	261,957	336,943

QUANTITIES.

Wheat Meal and Flour.	Month ended May 31, 1870. Cwt.	Month ended May 31, 1871. Cwt.
Germany	109,049	138,911
France	98,292	42
United States	201,477	88,259
British North America	19,869	34,645
Other Countries	36,409	35,364
Total	465,096	297,221

VALUE.

Germany	£75,766	£133,637
France	73,207	81
United States	130,120	6,382
British North America	13,080	25,870
Other Countries	25,095	34,736
Total	£317,268	£200,706

In guano there was a great decrease during the month. We only received 11,860 tons, to contrast with 29,405 in the corresponding month of last year, but this was nearly double the quantity we got in May 1869, and in the five months we have had importations of guano exceeding by 24,000 tons what we obtained in 1870. The money expended on this manurial substance since the year commenced has been £1,311,059; last year, up to the end of May, it was £1,092,344. The quantity of bones imported fell short by 1000 tons of the importation of May 1870, but in the longer period we had more by 7000 tons. The cost for the five months was £230,007, as against £178,372.

Of oil-seed cakes we received in the month 10,813 tons, which was less by 1000 tons than

landed in May last year. In the five hs, however, the quantity received was, ›und numbers, 12,000, the respective tities being 50,272 and 62,139 tons, and :ost £431,649 and £589,859 respec- r. The import of cotton seed in the :h was not a-third of what it was in May year, but in the longer period it was r, the quantity received being 100,888 to compare with 68,477, and the cost 5,486, as against £610,308. Of clover grass seeds, the supplies during the th were remarkably low, only 760 cwts., ;ainst 10,419, the cost being only £4600, ompare with £30,650 in May 1870. : was sent over to us in larger quantities, during the month and five months. :he latter period we received nearly ›le the quantity at nearly double the the price not having varied much. 1,990 was the sum paid up to the end [ay for this commodity, at the same date ;ear all we had expended was £255,891. ax seed and linseed we received much on the month, but more on the longer ›d than last year. The total sum we in the past five months, was £902,693, e corresponding term of last, £731,607. ›ough potatoes fall short in the five :hs as compared with the quantity last which was very far short of the supply 369, owing to the excellent home-crop, shew an augmentation in the month— ;4 cwts. having been received, as against :9. Prices, however, are very much :, the sum we paid for our supplies last :h being only £35,565, to contrast with ,688 in the corresponding month of the before. In other words, we had to pay t 10s. per cwt. last year for potatoes; :an buy this year at about 7s. 8d. wt.

: have had smaller returns of pork dur- ›e month, but more on the year, so far as ›s gone. Of poultry and game, the se is the case; we had more during the h, but less on the longer period.

›ming next to wool, we find that in the h our imports, entirely on account of a falling off from Australia, fell off about 6,500,000 lb.; but on the five months, we have an increase of more than 28,000,000 lb., the exact quantities being 154,892,187 lb. and 126,732,973 lb. respectively. The following table shews the quantities and values of last month's receipts:—

QUANTITIES.

	Month ended May 31, 1870.	Month ended May 31, 1871.
Wool, Sheep, and Lambs.	lb.	lb.
From Countries in Europe...	1,082,912	2,272,219
,, British Possessions in South Africa.....	2,962,866	3,840,065
,, British India.....	1,366,777	1,767,503
,, Australia.....	28,534,700	19,486,131
,, Other Countries	2,251,159	2,329,585
Total	36,198,414	29,695,503

VALUE.

From Countries in Europe...	£53,803	£114,899
,, British Possessions in South Africa.....	197,524	209,097
,, British India	44,135	54,357
,, Australia.....	1,820,146	1,144,905
,, Other Countries.....	73,947	88,804
Total.....	£2,189,555	£1,612,062

Turning to the other side of the ledger, we find that the quantity of butter despatched abroad of home manufacture was less, both in the month and five months, than in the preceding year. In cheese, it was less on the month, but more on the longer period. Butter was dearer in the five months, realizing £110,347, as against £104,687; and cheese was cheaper, making £43,162, to compare with £43,837.

There was a very large increase in the number of horses exported in both periods, and there is every probability that the demand will go on increasing for the continent, as the numbers devoured in Paris during the war must needs be supplied, now that peace is restored, as speedily as possible. Horse-breeders, therefore, have now a fine chance, and they should make hay while the sun shines. In May, we sent over, altogether,

510, of which 267 were for France, the rest for other countries; and up to the end of May, the total number exported was 3843, all of which went to France, with the exception of 679. The sum obtained for them amounted to £22,614, as against £8065, up to the end of May 1870.

Our wool has been in greater demand during the month than in the corresponding one of last year, but the price is lower, as will be seen from the following statistics. Notwithstanding the unhappy state of France, it will be noticed that she was our best customer. In the five months, the quantity imported was 16,088,788 lb., last year 15,444,344 lb., at the respective values of £2,065,377 and £2,170,197.

	Month ended May 31, 1870.	Month ended May 31, 1870.
QUANTITY.		
Wool, Sheep, and Lambs.	lb.	lb.
To Germany	88,334	128,848
,, Belgium	118,444	345,033
,, France	329,514	388,949
,, United States	15,350	133,762
,, Other Countries	86,865	169,102
Total	638,507	1,165,694
VALUE.		
To Germany	£6,504	£10,285
,, Belgium	7,493	22,869
,, France	22,262	35,297
,, United States	924	6,975
,, Other Countries	6,125	11,729
Total	£43,308	£87,155

THE WHEAT ROOT MAGGOT—(ANTHOMYIA FERRUGINEO-VITTATA).

WE adopt the above scientific name for this tiny but formidable crop destroyer, in deference to an eminent entomological authority, but we may mention that naturalists are by no means unanimous, for while others have since admitted that it may be an Anthomyia, it has also been referred to the generæa Oponyzas and Diastata; but without the specific name being condescended upon, and that of *ferrugineo-vittata* (rusty with dots, or rusty dotted) if correct, is considered not to be very applicable or happily chosen. This uncertainty regarding an insect that has effected such wide spread devastation as the wheat root maggot has accomplished in the present and former seasons, shews a lamentable deficiency in general, but more particularly in what may be termed practical entomological knowledge. Nor is the matter mended if reference is made to the best treatises on plant-destroying insects; for neither in that splendidly illustrated work of Curtis on the "Plant-Devouring Insects of Britain," nor the still more elegantly got up volume, by T. W. Harris, on the "Insects injurious to Vegetation in America," is this veritable wheat root maggot noticed, although, in both, some of its works of mischief are seemingly alluded to, but erroneously charged against others. A strong argument this against the apathy of our National Agricultural Society in not offering compensating awards for tracing out and recording the transformations and history of special or individual kinds of insects, that are hurtful to field plants, which knowledge is most essential to guide in the attainment of remedial or preventive measures, for either mitigating or arresting the destructive doings of these pests.

In conversing with cultivators from different parts of the kingdom, we have found that only a very decided minority of them attribute the losses in their wheat crops to the wheat-root maggot; nor are the writers of agricultural reports much nearer the mark, for the blame is assigned to "winter killing" and "winter pulling out"—whatever these terms may mean—as well as to throwing out by spring frosts; the ravages of grubs, wireworms, caterpillars, slugs, &c., while to

these, some, with commendable caution, add the clause, "or from some other causes." Seeing that it is in the first or larva stage of their existence, that insects are generally most destructive to plants, although some exceptions occur, such as the turnip fly, and others of the beetle family, it is highly desirable that in speaking or writing of such larvæ, strict attention should be paid to correctly applying their distinctive names, of maggots, grubs, and caterpillars, which, without going into the more minute differences applied by naturalists, may be thu characterized :—

Maggots, which are also locally designated *Mawks* and *Gentles*, are the footless larvæ of the two-winged flies which constitute the order *Diptera.*

Grubs have twelve segments or rings besides the head, and three pair of fore-legs, with, in some instances, a single terminal support or pro-leg, and are the larvæ of beetles and weevils, comprised in the order *Coleoptera.*

Caterpillars have, like the last, twelve segments or rings besides the head, and three pairs of fore-legs, to which are added two to five, or, in rare instances, more pairs of hind-legs, and are the larvæ of butterflies and moths, which form the order *Lepidopetra.*

Or, these may be still more briefly described thus :—*Maggots* are larvæ without feet; *grubs* have three pairs of fore-feet ; and caterpillars have three pairs of fore-feet together, with two or more pairs of hind-feet. On examining the wheat destroyer here alluded to, it will be seen that it is a true maggot, and we have applied the prefix of wheat-root, to distinguish it from that occasionally scarcely less formidable crop destroyer, the wheat-ear maggot—Cecidomyia Tritici.

It may be some consolation to wheat-growers, to know that all danger from the wheat-root maggots is now over for the season, lately we could only discover a very few specimens, and that in a high and late situation ; all the others having changed into the pupa or inert stage of their existence, from whence they may be expected to emerge as flies somewhat resembling those house pests which frequent our sugar-bowls when the wheat plants are in full ear. And it is to this third and last stage of their existence that attention should be generally and carefully directed, for the purpose of ascertaining how and where their eggs are deposited, from whence the maggots of next year will, in due course, emerge ; for when this knowledge is acquired, there only remains the discovery of a mode whereby those eggs may be easily destroyed, in order to free future wheat crops from like visitations with those which have lately been so disastrous.

The following notes of observation, which have recently been made in some of the best wheat districts in Scotland, will serve to exhibit the alarming amount of crop-destruction which the wheat-root maggot has there accomplished in the present season, and there is but too much ground for belief that in many other parts of the kingdom, the losses have been at least equally severe.

April 23.—Inspected a number of wheat fields in Clackmannanshire, chiefly composed of strong clay soil : found the maggots everywhere at work, and fully half of the plants already destroyed.

May 6.—From Edinburgh *via* Stirling to Perth : observed in all forty-four wheat fields by the sides of the railway, in at least thirty-eight of which more than half of the plants had been destroyed, while in five of these more than three-fourths of them were gone, four of them were being in part ploughed up and resown with barley, and several addi! tional fields between Edinburgh and Stirling seemed as if they had been recently wholly ploughed up and resown ; while in the six least affected fields, about a-third of the plants seemed wanting.

May 11.—Going from Edinburgh by the Waverley route, twelve fields were passed between the capital and the upper whea growing part of the county, from ten of which the plants had more than half disappeared, and the maggot ravages, although less prominent, were readily perceptible in the other two ; while, of the former, three were partly ploughed up and resown with barley,

and at least four others appeared as if they should have been treated in like manner.

May 12.—Between Portobello and Haddington, passed fifteen fields, of which ten seemed less than half, and four about two-thirds planted; while in one the maggot ravages were little more than just perceptible. Went, in the afternoon, with Mr Patrick Sheriff, that eminent raiser of new cereal grains, to see his collection of wheats, in a south-lying field about 1 mile north of Haddington. These were growing in drills 1 foot apart, across a 20-feet wide ridge, on the east side of the field, where they had the protection of a substantial stone wall, and numbered, in all, 109 kinds, besides 40 seedlings of last year's crosses. Only a few traces of the maggot were discovered among these, although, in the remainder of this field, and also in an adjoining one, fully half of the plants had perished. In searching here for maggots only two or three were found—they having all become pupæ. And it is worthy of remark, that in these two fields more than a dozen of wheat plants variegated, or "ribbon grass"-like leaves, were discovered.

May 13.—Through the kindness of Mr D. Roughead, the well-known seedsman of Haddington, and accompanied by him and Mr Patrick Sheriff, enjoyed a drive on a delightful day through an extensive, richly cultivated portion of East Lothian, but a portion of it being rather above the wheat growing districts of the county, only twenty-one wheat fields were passed, of which five were less than half, and two about two-thirds planted; while in seven, the maggot ravages, although apparent, were comparatively harmless, and in the other seven, were scarcely distinguishable. Passing out of Haddington by the Gifford road, the first five fields presented the two worst phases of maggot destruction. The next three, which were at a considerably higher altitude, on Mr Roughead's farm of Myreside, we include among the exempt fields; having only discovered very slight traces, and secured two specimens of the maggot, in walking through them. The soil was of a very heavy nature, and had been stirred to more than usual depth by steam cultivation. Here we were shewn about 30 Scotch acres of swedish turnip seed, for his East-Lothian improved variety of which, Mr Roughead has long been famed, and the plants being in bloom, a good opportunity was afforded us of judging as to the remarkable purity as well as excellence of the crop. At Tanderlane, in the highest wheat field visited, we secured six specimens of the maggot, all evidently verging on their change to pupæ, and here their presence, although very perceptible, could not have been pronounced very hurtful. The same remark applied to the next five fields. When descending to a lower altitude, a decidedly worse one was encountered, followed, in turn, by two still lower fields which were pronounced almost exempt. Then, just after crossing the river Tyne, east from Haddington, two fields were noted as being half destroyed—while, in their vicinity, and, in alternate order, two were exempt, and two evidently, but not very injuriously affected:—thus effectually upsetting the theory that the higher districts were more exempt than the lower, from the wheat-root maggot. And in the query of, How is this accounted for?—adding another puzzler to those who form hasty conclusions as to the causes that promote root maggot destructions of wheat.

On the high rented farms around Edinburgh, the wheat root maggots have been particularly destructive, and in many of them large breadths have been ploughed up. It does not follow, however, that the ultimate loss of crop will be in proportion to that of the plants, for where say half of these are destroyed, half of the crop will not be lost, as those plants which are left will have room to stock or tiller out, so that each will produce more ears than they would have done standing at full thickness. Unquestionably, however, the loss will be very great; and the excessive growth of weeds where the wheat plants are too thin, will tell heavily against the future fertility and working of the land.

THE FOUR-COURSE SYSTEM.

By Mr Hughes.*

IT may be relied upon that the prospects of the corn-grower in this country call for grave consideration. Several influences exist, and appear to be extending, which render the production of some of our standard crops unremunerative, or insufficiently so. The most overwhelming of these influences is the foreign supply. It is overwhelming as regards the prospects of our home-growth for these reasons: In quantity it is more than equal to the requirements of this country, even with a short yield of our own crop. And referring especially to wheat, the quality of a large proportion is even superior to our own; but, above all, it can be produced and sold in our markets at a price that is ruinous to our growers. It is also certain that the great corn-growing districts of Europe will now rapidly increase their production; their agriculture will improve faster than ours has done, for they are not slow to avail themselves of the best of our stock and implements—they will not only grow more acres, but more per acre. With us in both these respects it is quite the reverse. We have ridden our hobby to a standstill. We cannot increase our produce per acre, the land already holds out signals of distress. If we were to increase our area, we should fare no better. With us it is a question of price. Such, then, is the position in which we find ourselves with our standard crop—wheat—which occupies one-fourth of our land for eleven months out of the twelve. By taking warning in time, we may avert, or at any rate postpone for a time, the fate that awaits agriculture in England, especially as regards the growth of wheat. It will be unnecessary, in the face of the facts that follow in this statement, to draw a comparison between the position of the agriculturist now, as a trader in the commodities of his own production, and that of those who introduced the four-course rotation, as one naturally adapted to the wants of the soil and the means of the farmer. It is a common mistake to suppose that the business of agriculture passes the elasticity, or is capable of the developments and unlimited combinations that pertain to manufacture or to trade. The farmer's factory is the immovable land; and though the soil is grateful for help, and yielding to skilful management, Nature, who presides over all his works, will not be forced.

* Paper read before the Botley Farmers' Club.

UNPROFITABLENESS OF BEANS AND PEAS.

The object attempted in the re-arrangement of the old four-field system has been to suppress those crops that are declining in value, and, if possible, extend those that still yield a profit. But before we proceed to the diagram we must consider the case of the bean crop. The question is, whether beans have been a remunerative crop of late years, or whether we go on growing them as favourable in the prescribed rotation to ensure a successful wheat crop. If the foregoing remarks on the prospect of home-grown wheat are correct, the sacrifice will hardly pay. I do not believe, however, that beans have paid for growing for some years past, on land adapted for feeding sheep. They are not grown of necessity, nor for feeding our horses and cattle, for foreign feeding stuffs are cheaper and better adapted to the purpose. Indian corn, to a great extent, supplants the use of beans; moreover, sufficient oats may be grown on a portion of the wheat stubble to supply horse corn, and oil-cake is better suited to our stock, and as a fertilizer. I do not suppose anybody will make a stand for peas. In addition to the question of price, the frequent blight in both peas and beans suggests the prudence of

growing them less frequently, even if it is no way connected with the cause of blight. The manner in which blight attacks these crops indicates an unhealthy condition of the plant, which, if it does not produce the blight, immediately precedes and induces its attack. The wheat and beans in 1869 grown on the stouter soils, those naturally adapted to those crops, did not succumb to the blight as those did on the sharper soils, and it is remarkable that bean-land wheat suffered far the most. My own conviction is, that we have grown beans long enough, and that we should grow wheat less frequently upon the description of soil called turnip and barley land. I do not bring this series forward as naturally better than the original one, but as one forced upon us now by circumstances which did not exist in 1793, circumstances over which we have no control, and which render that system unprofitable. At the same time, I believe I am right in saying that the two crops which I propose to suppress, are those which drew most severely on the back-bone of the soil, and those which will be extended, or those which by nature feed to a much greater degree on those elements which are above the earth.

A PROFITABLE SUBSTITUTION OF BARLEY FOR WHEAT.

Referring to the diagram (which was barley first, then roots and seed, barley and wheat, roots, barley, seed and roots, wheat and barley, roots), it will be seen that I have cut out the bean and pea crop altogether, and khol rabi is prominent, *vice* beans and peas. The next step is to substitute barley for half the wheat course, making such an interchange with the kohl rabi and seeds as shall cause the seeds to be repeated once in eight years on the same land; and mark, the wheat, always following on the clover ley, will share the same advantage, and be planted under conditions that experience has proved most suited to its success. I have repeated the course over eight years, in order that the interchange for the benefit of the wheat and seeds might be more apparent. It will be asked, why not lay down part of the land? and I am not sure that ultimately this would not prove to have been the wisest course; but, I will also ask, who is to do it? If it were done without compensation from some quarter, we should sacrifice this generation for the next. Profitable pastures upon old worn-out land are not made in a year or in twenty years—scarcely in a lifetime, and no doubt the best land would be reserved under cultivation. There is also the objection that this would be a landlords' question, and in many cases would entail a considerable outlay upon him. The alteration I propose is one, no doubt, on which the landlord must be consulted, but it does not really affect him, except beneficially, by the improvement of the land. It is higher farming, and it is cleaner farming, than the other system. The objection that will be raised to the proposed rotation is, that barley and roots are repeated on one-eighth of the occupation, twice in three years. As a matter of fact founded on experience, barley will bear repeating more frequently than any other cereal, and, considering the improved condition of the soil, resulting from the substitution of the fed-off root crop in the place of an exhausting bean crop, I have no reason to doubt its success. Moreover, as that portion of the land upon which the repetition occurs is that portion of the barley course which will have the young seeds under it, a less bulky crop of straw will not be disadvantageous. I look for a pecuniary gain in the mere substitution of the barley for the one-eighth of wheat. For I hold it is more probable that we should grow 6 qrs. of barley after the roots fed off with cake and corn, than 4 qrs. of wheat after a failing and foul bean crop, and they are as sure to be foul as they are failing. Putting the barley at 4s. 6d. per bushel, and wheat at 6s., there would be a balance in favour of the barley of 24s. per acre. In addition to the pecuniary advantages which may thus be fairly expected, there are practical gains materially affecting the rest of the system. On the old system, the barley stubble laid dead for five months, with the exception of the once ploughing for the beans. On the new, the same land would receive seven months' fallow, the most important of which is obvious, namely, the

sown barley occupying the eighth, on the original plan, was sown with affords ample time for the consumpf the roots which have superseded the The diminution of the time occupied at sowing, furthers the progress of other tant work at a time of great pressure. dering the time that wheat occupies the d, nearly three times as long as barley, and must gain by the change; for gh wheat is not drawing more than months out of the eleven, still it occuie ground and harbours rubbish. The ions for the barley are less costly in way than for the wheat.

)VANTAGEOUS SUBSTITUTION OF ROOTS FOR BEANS.

h regard to the second and most imit change proposed, namely, the substiof roots for the beans, a considerable tage presents itself in favour of the

Of course, no fixed amount of profit : determined upon, it must depend on ilk of the root crop: the cost of the at buying in, and the value of mutton ool at selling out. Last year, my sheep ie scarcely £2 per acre net profit, this nore than £11. The range is large, nyhow promises results under favourircumstances to the best corn crop, and the crop and the price are both good,) an amount per acre more than equal to : corn crops put together. As to the ion of the roots alluded to before, I do)pose to increase the breadth of turnips, d rather allow mangolds to encroach hat on the turnips, and let kohl-rabi r the vacant place; it is almost proof t the fly, for they will rally and make plants if they are eaten to the ground, vill stand out all winters, or store r well, and they are the best sheep- I know, the bulb being clear of the lessening the expense of preparing the The preparation of an additional eighth farm for roots would, no doubt, entail perations than the simple ploughing for

To set against this, there would not work and delay of harvesting the bean crop, nor the expense of cleaning the land for wheat.

THE MERITS OF SUCH A SYSTEM.

Without going over the ground again, I think it is known that, first, the substitution of the barley for the wheat is likely, apart from any question of expense, to leave a balance in favour of the barley; that it entails a saving of labour and time at a busy period of the year, and is of great practical advantage in facilitating the working of the rest of the system. And secondly, that the removal of the bean crop is the removal of a loss; that the substitution of the root crop is a gain of considerable importance, without offering any practical difficulties. In weighing the truth of the position in which I have assumed the corn-grower of this country now finds himself, as well as the merits of this change of system as a remedy, it is important to bear in mind the description of land for which it is intended, viz., such land as is known by practical men as turnip and barley land, well adapted for feeding off with sheep, and consequently not strictly either wheat or bean land. How far such a system may be extended to other soils, I must leave to the discretion of those who occupy these soils. There are men now-a-days who will go into the field with their team, and by a Macadamizing process of smashing up and crushing down they will undertake to make the soil suit the system, and they are the valued patrons of our great implement makers—"agricultural engineers." But cramped as our resources are, and considering the heavy imposts laid upon us, I would rather recommend that we should avail ourselves of the assistance of the elements than challenge them to a trial of strength, and, guided by the evidence of past experience, endeavour to adapt our system to the soil of the times.

THE POSITION OF THE FARMER: WHAT IS REALLY WANTED.

The *bona fide* farmer is greatly disadvantaged in these days by the influx of capitalists from other professions. Many of

these individuals, coming quite prepared, and content to lose money in the enjoyments of country life after years of toil in our large cities, create a ruinous competition. There is another point that adds to the embarrassment of the times, and that is the present social position of the farmers of these days. Education has become necessary, and with it has come refinement. The farmer's household is no longer supported in the style of 1800. He cannot divide his income in the way set forth by Tusser's quaint lines :—

1. One part cast forth for rent due out of hand.
2. One other part for seed to sow the land.
3. Another part leave parson for his tithe.
4. Another part for harvest sickle and scythe.
5. One part for ploughwright, cartwright, knacker, and smith.
6. One part to uphold the teams that draw these with.
7. Another part for servants' and workmen's wages lay.
8. One part for fill belly day by day.
9. One part the wife for needful things doth crave.
10. Thyself, and thy children, the last part would have.

At the time Mr Coke introduced the four-course shift, grain was wanted, and especially wheat. Corn was his aim ; the green crops subserved the purpose ; times have changed. What is wanted now is beef and mutton of the best quality, and we must only grow so much corn as will not stand in the way of our producing the utmost quantity of meat, and we must endeavour to grow it under circumstances that will reduce the cost and improve the quality. This is the object I have attempted to accomplish in the alterations I have proposed in our prevailing course of cropping. I have endeavoured throughout to deal with the subject in a practical manner. It is no speculative scheme, but founded in every step upon the sure ground of experience. My projects are not offered as a cure for the inevitable fate that awaits this branch of British agriculture, but I believe, that without deranging in any degree the present inclosures, or involving any outlay beyond the purchase of stock, it will, for a time at any rate, increase the produce of the land without increasing the outlay.

FLAX CULTURE IN THE UNITED KINGDOM.

CLIMATE divides, in the United States of America, the cotton-raising portion from those parts of the country in which that crop will not grow. But no such inexorable dictator at all interferes with the boundaries of flax cultivation, which are in the power of the farmer in every part of the United Kingdom, to shift as he pleases. Farmers, however, consider the chances of sale as well as of profit ; and while they are in sympathy with the consumers of corn, they seem to have yet to find out what the wants of the manufacturers of textile fabrics are, and how they can supply them with that fibre, without which the spindles of the factory can no more be made to go than would the millstones of the corn mill be moved if wheat and oats could not be had. We shall therefore bring a few facts in the history of flax manufacture together, with the view of shewing how much the cultivation of the flax crop may contribute, at once to the ends of progress in our manufacturing industry, and the increase of reward for their own labour.

Amongst the most antient of textile trades anywhere, linen is foremost ; and, so far as the United Kingdom is concerned, it was the leading textile trade of these countries until the early part of the present century, when cotton was allowed to cut it out for the time being.

The restoration of the linen trade to its proper place in respect to cotton is, therefore, the first effect extensive flax culture would have, and in the production of such a result farmers would, in addition to the securing of

gricultural profits, give occasion for ease of demand for every article of sed on a farm. The first point in the of cotton manufacture in which any n the United Kingdom can be inte- is when a British capitalist becomes, avour of a friend in the United States erica, a shareholder in one of the ı which cotton is usually carried, or it is imported in British bottoms. as warehouse keepers, labourers, , and bankers, in connexion with the of cotton, the British do gain, and gained largely; but the gain of our on our textile trades, so long as there loyed an undue proportion of cotton present, in regard to flax, must be less than it would be if flax was d to its proper place. The people gland had a linen trade since the f the Romans, but they allowed it g out a miserable existence up till ginning of the fourteenth century, Edward III. invited weavers from rs, and he tried to improve the trade cing more linen at home, and import- s, as the fibre was thus beginning enerally to take its natural place (in a y sense) in regard to woollen cloth. In Scotland, and Ireland, linen cloth had contend with woollen in the make-up of robe, but the general result for several ies past was in favour of a fair divide: was not till it had to grapple with that it lost ground so sadly, as to be in the position it now occupies in the l Kingdom amongst textile fabrics. g as the battle was between favourites gs and the pets of Parliamentary pa- e, linen never fared so ill as it has f late. When those by whom it should een held in its place were the growers and the spinners of fibres, and those were interested in lessening the con- ion of linen and increasing that of , were trans-Atlantic merchants and tton lords of Lancashire, flax had at poor supporters and most formidable The days of monopoly are gone; and there is no hope in the direction of ı patronage, or a subsidy from the quer, there is, nevertheless, every con- fidence to be placed in an enlightened public, whose verdict, as between the rival claimants of flax and cotton for a first place, will be according to evidence. Already, the United Kingdom exports piece goods to Russia, Prussia, Hanse Towns, Spain, Italy, and the United States of America; also linen yarns to most of these and other places, as well as to British Colonies; but for want of flax, after importing from Russia, Belgium, and many other countries, this trade, which is both directly and indirectly more profitable than cotton, is cramped and circumscribed.

We ask not only agriculturists, but the public generally, to consider the bearings of the flax culture cause upon every interest in the country; and we believe that so soon as the matter is at all fairly considered, the result will be, that while we congratulate ourselves in having kept pace with the progress of the age in everything else, we must admit we are behind in respect to the position we place flax and cotton in respectively. Do as we may, we can gain but little by cotton in comparison with flax; and that little lessens rapidly, and may be very small indeed ere long, if the cotton-spinning trade of the United States of America continues to prosper. Let us be as slovenly as we can for shame, and we cannot but gain much on flax, and whatever we gain must be increased in proportion to our successes in technical education, the invention and making of machinery, and in agriculture and commerce generally.

Scotland has made a bold beginning in the trade. Her mills, which are chiefly on heavy goods, are now probably nearly 200, whilst those of England are under 150, and Ireland not many more than 100. The hemp trade of Scotland is also far ahead of that of England and Ireland; whilst in jute, the enterprise of the Scotch has been such a pattern as we should like to see followed in regard to flax. But while a sufficient supply can be had of cotton for all classes of fabric, the supply of flax is so limited as to forbid expansion, both in the Dundee or heavy goods department, and the Belfast or light goods branch, as well as in the trade of England in linens, and such is the present state of the trade in the Unit Kingdom.

FLAX GROWING IN ENGLAND AND SCOTLAND.

A FACT, we believe, not generally known, is one supplied by the Agricultural Returns recently issued, viz., that in every county of England and Wales flax crops are more or less cultivated. The acreage under this crop, like other crops, varies considerably. Thus, in Rutland, where, in 1869, there were 87 acres in flax, in 1870 there were only 2. In Berks, Chester, Cumberland, Durham, Hants, Hertford, Middlesex, Monmouth, Salop, and Westmoreland, there is also a falling off. In Lincoln, Suffolk, Norfolk, and Cambridge, in which counties most flax is grown, there is considerable increase; in Suffolk alone there is an addition of 1000 acres. The increase in England, in 1870, over 1869, was 2871 acres, and in Wales, 70. The total acreage under this crop last year in England was 22,354, and in Wales 204. That the crop should be more cultivated where it is best known, seems, apart from all other reasons, a fact worthy of notice, as it obviously indicates a growing feeling in its favour. There is not, as yet, however, a sufficient breadth under the crop in any county to justify the introduction of the most economical modes of manipulating the fibre; but so far as the saving of seed is concerned, it makes but little difference how many or how few acres are cultivated.

Flax is no stranger in England, for the existence of a woollen, and also a linen manufactory, for clothing the Roman army in Britain, at Venta, Belgarnie (now Winchester), is a matter of history. But even before the Romans entered England, the people were, if not as expert as the Gauls at the spinning of flax and weaving of linen cloth, yet they also practised both, as did their neighbours. It seems that the manufacture of flax was for some time neglected; but it does not appear that even the use of linen cloth ceased in England from the earliest time in which it was known. Perhaps the knowledge of the linen manufacture came from the Phœnicians, as a consequence of their visiting Cornwall for the sake of its minerals.

Not a county in Wales returns a blank as to flax crops in 1869 and 1870. In Anglesea, 2 acres are returned for each of these years. In 1869, Brecon figures for 3 acres, and in 1870 for 27 acres of flax crops. In Cardigan, Carmarthen, Flint, and Radnor, there is an increase; while in Carnarvon there are 3 acres for 1869, and only 1 for 1870. Glamorgan has, in 1870, only 20; in 1869, 23 were grown in that county. Montgomery shews a falling off; and Pembroke has the same (12 acres) in each year.

So much for the present. In the past, as we learn from sources not to be doubted, flax and wool were spun by the females of every Anglo-Saxon household; and, as everyone knows, having spun the necessary quantity of wool or flax to make the requisite supply of cloth for probable household use, at once entitled a young woman to a husband, and conferred on her the title of spinster—a term of honour still applied to young ladies of marriageable age. The daughters of the people in all ranks spun, and spinning was the household work of every house, not excepting that of the king—the daughters of King Edward the Elder, and sisters of Athelstan, being famous spinners.

Flax crops, we think, might be greatly increased in every part of the United Kingdom, except, perhaps, in the Province of Ulster. Such an increase would yield at least £3,000,000 more than is raised by the present modes of cropping, while it would not lessen the fecundity of the soil, or so sensibly reduce the supply of food as to be felt injuriously. The question, whether or not flax is, in any special sense, a "scourging" crop, may safely be left open, though those most experienced in the culture of the crop refuse to believe any such statement. But supposing it be so, under the slovenly mode

ig still continued in Ulster, it only little, very little enterprise, and an ıot worthy of consideration in com- with the certainty of profitable results e to the soil, in kind, everything the) takes from it. If this were done, rential profits on farming, including crop in any rotation, as compared se of cases in which it is excluded, ɔe set down at £4,000,000 or ooo, instead of £3,000,000. Flax grown almost anywhere, and the should be, Will it pay me better than corn, or green crops? and not on iry, Would it grow on my farm? We :n good flax growing on a hill-side above the level of the sea, and in y upon which we looked down from

In the county of Devon, we have ɜn the fourth crop in succession, and verage crop too. We have seen it ı a garden in west Cork, and in a field exposed to the Atlantic in Connaught, and where it got fair treatment the crop was good, and in every case where the manipulation was carried on as farmers in England and Wales treat their corn, hay, and other crops, it paid a liberal profit.

In Scotland, flax crops are represented very generally in both 1869 and 1870. In the latter year, on the whole, there is an increase, the increase being chiefly in Ayr, Dumbarton, Lanark, Linlithgow, Roxburgh, and Stirling, respectively; Bute, Clackmannan, Inverness, Kinross, Kirkcubright, Nairn, Shetland, Peebles, Ross and Cromarty, Selkirk, and Sutherland, are each blank for both 1869 and 1870, and Caithness, which was blank in 1869, shews 3 acres in 1870. The total quantity raised in Scotland, in 1870, was 1399 acres, as against 1306 in 1869. There are some further intertesting particulars in connexion with flax culture to which we will probably refer again.

FLAX CULTURE AND FOOD SUPPLIES.

may dislodge every notion that opposes flax crops because of their ; effect on the soil; and we may :eed in establishing the fact, that, troduction of a flax crop into every the general results of farming would ly more profitable. But we should e to meet those who say that, by :hange, the supply of food on the ıld be so seriously lessened as to ın counteract the advantage of in profits. Let us look at the case, as it stands, and before coming to ;ion, consider at least a few points idence bearing on the matter.

.ke the case of a farmer growing ıs chiefly for fibre, and, considering ts on food supplies of his sowing l instead of wheat or oats, we find :ad of the straw of an acre of grain, ıbout 15 bushels seed, and 4 or 5 bushels husks and dust. The seed is all good for food, and before casting the husks into the dunghill, it may be well to see if something may not be made of a portion of them, over and above their value as manure. But regarding husks as only manure, for the sake of argument, we venture to place the seed for feeding purposes as equivalent to the produce in straw, for like ends, of the best acre on the farm. But supposing the seed is cleansed and made fit for "sowing seed," and the 8 or 10 bushels of such is sold, and its price laid out in food, still we do not fear to ask the most prejudiced against flax crops to compare the stuff (whatever may be selected) purchased for the sum the seed sold for, *plus* the merely feeding seed, with the feeding properties or selling price of the largest quantity of straw that could be raised on the acre of ground given to the flax crop. But ex-

perience shews that farmers who raise flax crops do not feel any shortness in supply of food as a consequence. Facts, easily ascertained, testify to the contrary. For example, from 1841 to 1861, the increase in value of live stock per square mile in Ireland was under 60 per cent. In Ulster, the flax growing province, and while flax culture was extending, the increase was 67 per cent. In Connaught, it was 64 per cent. In Munster, 54 per cent. In Leinster, 52 per cent. We do admit that a variety of influences may operate to increase or lessen the value of live stock in an area of the size of the respective provinces in Ireland, but we are nevertheless well satisfied that if the general tendency of flax culture was to reduce food supplies on a farm, Ulster could not at once extend the area under flax crops, and feed a proportionately greater number of live stock, on the average, during twenty years, than were fed in the other provinces. But we should rather see American clippers laden inwards with grain to feed live stock, if need be, than to see them carrying chiefly cotton, to keep our textile trades in that anomalous position they now occupy, which is bad for workers in iron, in bricks and mortar, for capitalists and men of science, as well as landowners and farmers. There is, however, another side of the food question in relation to flax crops, which we need only mention to shew that it, too, is worthy of more than a passing thought. For instance, if farmers persist in refusing to supply textile trades with flax fibre, they actually force from their own doors the mouths to fill which they feed beeves, fatten sheep, make butter and cheese, and grow vegetables and corn. Better is it surely to import corn than export people. Better to feed our own people while raising, and manipulating, and manufacturing flax, than drive them, for want of work, to places from which, if we need it, we could draw food supplies to any extent without loss; whilst to import fibre to the least avoidable extent, is at once to do the worst thing possible to be done, as regards, at least, the most vital side of the food question, in relation to flax crops.

We could sincerely wish to see the British and Irish people imitate, in regard to flax culture, our cousins in the far west, in their bold, praiseworthy, and truly wise ways, in respect to shorthorns. Perhaps, if we allow this matter to take its course, we may find, when it is too late to retrace our steps, that the present had just been the right time to look the matter fully in the face.

FLAX CULTURE AND MANURE MAKING.

IT is scarcely fair, in face of agricultural statistics before us, to assume that the farmers of either England, and Wales, or Scotland, are unwilling to grow flax to the extent indicated by the requirements of scientific farming, justified by profitable results. Yet the thing is only done on a very small scale, and till it assumes its proper proportions, it seems requisite to deal with a few more of the imaginary difficulties still in the way. It has been supposed that where flax is extensively cultivated, natural fertilizers must necessarily be scarce; but those who have inquired into the case in all its details, find that no such result is ever found; on the contrary, a skilful farmer always makes his flax growing bring additions to his manure heap, which no other crop, occupying the same ground, could be made to contribute. This will not only appear to be credible, but will also appear as naturally arising from existing circumstances, if we consider the following facts. Take 1 acre of green flax, before it is rippled, to weigh 2 tons, and after it is rippled, 1¼ ton. The produce of seed would be about 6 or 8 cwt., leaving the

ist for manure, and on the principle that or everything Nature has a place, and anything, no matter what, is good if in its own lace, let the waste of the rippling process e made in some way to contribute to the tock of manure, and it surely will do some ood. Flax, in the process of retting, loses bout one-fourth of its weight, but it leaves hat behind in the retting pits, and it only equires that clay, or peat mould, or the horter "shoves" of the scutching mill be dded, to convert this most valuable comonent of a fertilizer into manure. We need ot add, what is too palpable to be overooked, that where feeding on flax seed is arried on, supplies of manure always gain as much or more than where food of other kinds is used. But some one may say that though all we have advanced is the case, and admitting it to be quite practicable to make a lax crop the occasion of increasing farm-yard ertilizers, a great amount of care is requisite, nd much attention to many things not unikely to be neglected, become imperatively onditions of these desiderata. If such an bjection be made, we avert it by confessing hat flax is not a lazy man's crop. We also dmit that unless skill and care be brought o bear upon it, it is very liable to go astray. But we do not admit that it is any more difficult to manage flax crops well, than to manage potato, grain, or other crops properly. Still more, we must take leave to say, hat before allowing the greater risk arising rom the increased value of a flax crop, compared with a grain crop, to be reckoned gainst it, we must ask that the principle be xtended, and a better breed of cattle, sheep, igs, and horses, be also condemned, because hat, in the loss of one beast of the improved haracter, four or five, or ten times the sum oes that would have been swallowed up if he old and now almost forgotten distortions in the shape of live stock had not been improved from the face of almost every farm in the United Kingdom. We prefer rather to commend flax crops in substitution of grain crops, because a greater amount of capital, more labour, and increased skill, with their concomitants of heavier risks, are required in their production, and we therefore pass no apology for pressing the cause of these crops upon public attention on account of these things.

But there is another light in which the manure question in relation to flax crops must be considered, and it is this, that the class of manure necessary to keep up the ground to a flax growing condition may be more cheaply produced than is that which a severe process of growing demands, in order to keep the soil fertile. Flax manures need a larger supply of alkalies in proportion to silica or silicious sands, phosphates, or organic matter, and if even the deposits of the retting pit which supplies these be overlooked, they may be readily got from marine plants, and other sources of supply, easy of access and demanding but small outlay. We believe that, viewed from whatever standpoint, the relation in all these bearings of flax crops to the supply of manure, needs only to be considered, to supply reasons innumerable in their favour, as compared with grain crops. Some have supposed that the getting over the difficulty respecting sctuching mills is impracticable. We shall only just now say, in regard to that matter, that any one who has attended our agricultural shows, or who knows anything of the enterprising powers of the machine makers of the United Kingdom, will see that no difficulty exists here, except such as a fancy, unchecked by information, is likely to lead persons of an imaginative mind to indulge in.

THE FLAX CROP.

DIFFICULTIES OF MANUIPULATING AND OF MARKETING.

EVEN where the process is most rudely conducted, the end of agricultural enterprise and labour, which we take to be profit, seems as easily obtained by a flax crop as by any other. The preparation of both seed and fibre, or of either, if one be sacrificed to the other, has been, and is every year successfully carried out on the worst cultivated farms, while the facilities for sale are as many and quite as accessible for flax-seed or flax-fibre, as for wheat, oats, barley, or hops. If the expense of rippling-combs be avoided, and the cost of rippling saved, the flax-straw, in its green state, is got at once into the retting pits; when retted, it is grassed (or bleached), and if there be no scutch-mill near at hand, the fibre may be prepared for market by hand-scutching. These modes of dealing with seed and fibre are rapidly departing from the ordinary practice of flax growers. The advantages of leaving the bolls in the flax are, that no risk is run by unskilful rippling, and some say the fibre gains in quality in consequence of the contribution, in the retting process, of the oil of the seed to that of the stalk in making the fibre "kindly;" but its disadvantages are the loss of the seed, and the danger of the stalk breaking of its own weight in handling, or of its being broken in the attempt to knock the bolls off. The chief disadvantages of hand-scutching are the slowness and the greater cost of the process. But suppose it possible for people to have nothing else to do in winter, hand-scutching may be applied instead of mill-scutching, without greatly lessening the gross sum realized for the produce. It is, nevertheless, necessary for successful flax-culture, that scutch-mills should be erected in sufficient numbers, and at convenient distances, so that each farmer may be able to get his crop scutched within four or five months, which seems to be the flax marketing season. The cost of erecting a scutch-mill is small, and the profits arising from scutching for hire, liberal. But where farms are large, as in England and Scotland, each farmer might have a small mill of about three, six, or nine stocks, in either of which skilful scutching may be practised as well as in mills of the largest size. The quantity of flax scutched annually in Ireland is, on the average of the past five years, between 40,000 and 50,000 tons. In 1865, the returns shew 64,506; 1867, 39,561; 1868, 40,991; 1869, 35,670; and 1870, 36,615 tons; and this is done by about 16,000 mills, seven-eighths of which are in Ulster. At each of these mills, if necessary, a buyer would attend, but in a general way farmers prefer selling their flax in the open market. But supposing flax growers in England and Scotland could find no market for their fibre in the locality, and that no one attended at the Scotch mills to buy for the spinners, the cost of transit of the produce of an acre of flax from any corner of the United Kingdom, to Belfast, Dundee, Leeds, or to the particular mills direct, which its peculiar quality suited, *plus* agents' fees for selling, and all expenses, would be too small to be worthy of consideration, as an argument against growing it. No such difficulties, however, could possibly exist, for as soon as the farmers of Great Britain would grow flax, spinners would look after it. Besides, mills would be erected for spinning flax in all parts of the country, and several of the purposes now served by calico would be better served by linen. More enlightened modes of manipulating flax than any as yet used, might be adopted with great advantage to the farmer. We could not attempt, in these columns, to give a detailed description of any plan, though we had one ready; yet the largest share of our confidence is in those which at once separate certain processes now

, and join others usually separated. · idea we have of reform in manipu- ax crops, though we cannot give even lines of a plan, is that in proportion urries operations into the hands of cturers, immediately after the crop is in that proportion is it commendable. the manufacturing of flax commences is pulled; and, therefore, if the farmer crop green, and if a class of manipu- undertaking retting, bleaching, and ig, were called into existence, so much er for both agriculturist and manufac- Dealers to buy flax "on the foot" seem d ;" and though some persons in that e not conducted their trading according gh standard of mercantile ethics, yet has been said of people, and, it is to ed, justly, in every other branch of s ; and still no one supposes that the callings created in the interests of a of labour, are to be regretted; nor do ose dealing in green flax will be con- an exception. Besides this and like s of labour, there seems also a neces- such combinations as would facilitate the utilization of both "shoves" and "steep water." We do not stake the argument in favour of extended flax culture, or any condition of reform in the mode of manipulation. Nor do we see any impracticability of such extension arising from a want of markets. Still more, we have only to look at matters as they are, to be convinced that if scutching-machines were wanted, as a consequence of flax extension, it would be supplied by the same manufacturers, who have not only met the necessity for improved ploughs and other implements, but have done much to accelerate reform by the introduction, unasked, of new and reformed implements of agricultural operations. Taking the case as it is, there is no insurmountable difficulty in the way of extending flax-culture in England, Wales, and Scotland, up to the limits of a scientific rotation, except it be that where soft water is not successful, retting is impossible. But if the waters of the rivers and springs of a locality be hard, the gathering of the rainfall meets the case, and places this objection alongside the other real or imaginary hindrances amongst the things that have been.

FEEDING CATTLE.

HEN a farmer has once obtained a stock of good cattle, his next care be to feed them well. An insufficient of food will stunt the size and impair lity of the best of cattle. Nature has d their mothers' milk as their first food, most ingenious breeder cannot sup- better. All farmers like well-milked –they know that plenty of milk puts their banes," which, with ordinary ill never get wholly out again. Milk, r, is not a cheap article to feed them a cow has often to be kept for a whole no other purpose than to milk her d a year's keep now-a-days cannot be nder £8. This being the case, no one need wonder although hand-feeding is frequently resorted to, as by it the quantity of milk can be diminished and other substances given instead. Oatmeal, peasmeal, linseed-meal, and Indian corn meal, have all been used for the purpose. Indian corn meal is especially suitable if it is wished to make the calf fat, and peasmeal when flesh is wanted on it. Oatmeal and linseed meal are each rich in both fat and flesh-forming substances, but the latter is the more so. These meals, which are all made into gruel before they are given to calves, should never be used before the calves are a month old, and after that age to those only whose digestive organs are not de-

ranged by them. It may be remarked regarding meals of this kind, that a cake could be made, by baking them in a mixture of treacle and water, for the fattening of larger cattle that could not be surpassed by any at present in the market. After calves are weaned, they often receive no other food than grass, straw, and turnips, till they are sold to the butcher. These articles grow to farmers, and as they do not cost them cash directly, they consider them the cheapest of feeding substances. Large quantities of turnips should not, however, be given to calves during their first winter. With such they are apt to scour, and to become tucked up in their bellies, so that they assume an unthriving appearance which often never leaves them. With only a moderate supply of turnips, and 1 lb. of oil-cake daily, calves of that age generally thrive better than when they get all they can eat of the former without cake. A full allowance of good straw should never be withheld from cattle at this age. Indeed, plenty of straw is indispensable to the thriving of cattle at any age. In addition to these, many other substances may be used for the feeding of cattle, and there are times when the farmer even may use them with profit.

The food of all animals must contain at least three elements—viz., a flesh-forming, a heat-giving, and a mineral. The first is required for the development and maintenance of muscle, &c., the next, for the production of fat, and the last, for the formation of bones, &c. The amount of these elements varies considerably in different articles of food—100 lb. of the undernoted varieties of cattle food yield them in about the following proportions :—

	Flesh-forming.	Heat-giving.	Mineral.
Hay	9	44	8
Oat Straw	2	32	4
Barley Grain ...	12	62	3
Oats	14	58	4
Peas and Beans .	23	60	3
Oilcake.....	22	51	8
Linseed	19	59	5
Potatoes	2	23	1
Turnips.....	1	12	2

Farmers often consume large quantities of food to no purpose, by inattention to preserving a temperate heat in their byres, and having always on hand a supply of fresh turnips for stormy weather.

The leaving of cattle too long in the fields at the close of the grass season, is another source of loss to many farmers. The air by that time gets colder, and nature endeavours to protect cattle exposed to it by thickening their skins and bringing heavy coats of hair upon them. In consequence of this, they may not appear to lose condition at the time; but the soft and flabby feel they acquire shortly after they are taken in-doors shews that they really do so. Again, not a few farmers suffer loss by giving too much artificial food to their cattle. If the cost of feeding many of the best animals that appear at cattle shows were summed up, it would often be found that the honours won by them were dearly bought. £1 a-week is frequently insufficient to pay the board of many prize-takers for months previous to the time they come forward to compete for them. A few pounds of oil-cake daily, or something else at little cost, may be profitably given for a couple of months or so to finish feeding cattle; but if a farmer goes to much cost, or continues expensive food for a long period, he will usually find that he is doing so to his loss.

An occasional change of food is of much benefit in feeding cattle; it helps to sustain a good appetite in them, and make them thrive. A shift of pasture every month or so, where it can be done, may be given as an example of this. A diet of yellow turnips now and then, when they are on swedes, will also aid in promoting the same object. While at pasture, a full bite is always desirable; but the greener and more tender it is kept, cattle like it the better, and it does them most good. House feeding of cattle during summer is not much practised in Aberdeenshire. More manual labour would doubtless be required by it; but a greater number of animals could be kept on the same ground by cutting the grass than could be done by pasturing it. In addition to this, cattle fed in-doors in summer would be freed from the "gad-fly," the

torments of which keep many of them in such a state of excitement that they lose during the period of their visit.

The want of a good cattleman in attendance is another cause by which the stock of many farmers do not improve so well as they might. Such a man will be punctual as to time in feeding his charge, and will always contrive to keep them quiet, clean, and comfortable, all which are helpful to their thriving well. A good cattleman will also be careful never to waste provender, and so will manage to keep more beasts on a farm than a thoughtless, careless one will. Again, if a farmer cannot always be at hand himself, an experienced man among his stock will, in the calving season, be found of great value, and such should never be a-wanting there.

The doctoring of their sick cattle too much on their own skill is frequently another cause of loss to farmers. They defer sending for the "farrier" till all their own remedies have failed, and the patient past recovery, and when afterwards it dies, they give him credit for killing it by his treatment.—*Aberdeen Free Press.*

PIG BREEDING AND FEEDING.

By J. J. Mechi.

THE same rule applies to pigs as to other farm animals—choose a good breed, especially in the male parent. Where there is a great natural tendency to fatten, follow the advice of the late Mr Fisher Hobbs, who said, when selling a breeding sow, "Let her work hard for a living; don't feed her bountifully, or she will get fat and have no pigs, or very few." There was wisdom in this; but remember that the kind of food you give her is a most important consideration. The fœtus cannot be properly formed unless the materials are of the right sort, for there must be the elements of bone, muscle, and fat—the latter alone is of little use; therefore avoid the fatal mistake of giving to the sow a large quantity of roots before parturition. The same mistake is often made with sheep and cows. If a sow is allowed to range at large, she does well, having access to pasture, because in a good pasture we have a great variety of plants possessing various and valuable qualities—aromatic, condimental, and others, generally available to the juvenile formation and development, which the natural instinct of the animal teaches her to select. This may be supplemented by pollard, bran, a little meal, boiled potatoes, and a few swedes or white turnips, but very few mangolds, especially when fresh and succulent. A moderate supply of peas, beans, and barley, or soaked Indian corn, may be added; also tares, clover, and green beans with the pods on. Cabbage is very safe food. Nothing comes amiss to a sow. The great point is to take care that the food should consist of a variety, and not, as is too often the case, confined to one sort, especially roots. After parturition, roots may be much more liberally given, and especially cabbage, in conjunction with other food; but as the period of parturition approaches, and especially immediately after parturition, to guard against fever, the diet should be sparing and cooling. I know some who invariably give 1 ounce of Epsom salts in the liquid food to the sow after parturition. After recovering from the excitement, the necessary materials for milk-making must be contained in the food. Cottagers are often successful with their sows where they have a chance of roaming in lanes and coming home to receive a little meal, boiled potatoes, pot liquor, vegetables, &c. In cold weather, warmth and shelter are

essential. Never allow a pig to bury itself in stable manure, or make holes in the floor and lie in them, for cold will strike the heated side and give him heaves or lung complaint. Young pigs, when taken from the mother, should have pollard, a little meal, and a variety of food, but especially skimmed milk with fine pollard or middlings, and as they grow older, peas, soaked with Indian corn, &c. A few roots and green food are always acceptable. For fattening pigs nothing beats one-third pea-meal and two-thirds barleymeal, if mixed with skimmed milk so much the better. Pigs may be fattened very rapidly by steamed roots, mixed with meal or boiled potatoes, the food given warm. Although bulky looking, they will not weigh so well, or eat so well, as those fattened on pea and barleymeal, with or without milk. I was very successful in fattening pigs or large hogs in hot weather by placing them on sparred floors, with a pit under them. There is a natural tendency in pigs to huddle together; if placed on soft barleystraw there is no circulation of air under them, therefore stiff, reedy wheatstraw is much to be preferred. They get fever in hot weather, unless there is circulation of air around them, and plenty of water. The latticed or sparred floors have an immense advantage in this respect. The urine all passes through and away, and they lie clean, cool, and dry, with air circulating around them. Pigs naturally deposit their solid excrement in a corner away from their bed. When barley was 18s. 6d. per qr., I fattened about 400 pigs, and was always very successful in avoiding disease; they were all placed on sparred floors. In hot weather we showered upon them occasionally from the jet, about 80 gallons of water per minute; after the first alarm they enjoyed it, their skins became as clean as the back of one's hand, and they fed and prospered most satisfactorily.

It Is worth the trouble to give a pig, when he first comes from market, a good scrubbing with soap and water. In winter, it is necessary either to put some straw upon the sparred floor, or to enclose the place so as to keep it warm, providing sufficient ventilation. Pigs pay (in manure) as well or better than most animals, but the meat market will not carry a heavy supply, for, unlike beef or mutton, it is easily over-supplied. October and the cool months are best for town markets. Fat pigs in the country sell well at, and immediately after, harvest, also at hoeing time. Pigs, like other farm animals, should always have access to water, also to a lump of rock-salt. Bear in mind that pigs have no wool, and if well bred very little hair, therefore they require warmth, if you desire to economize food and produce fat. As sows are very apt to overlie their young, this is easily prevented by a ledge or board, of about 8 inches wide, projecting from the wall of the piggery, 6 to 7 inches from the floor. The little pigs are safe from pressure under this ledge.

THE PRINCIPLES OF BREEDING STOCK.

AT a meeting of the Midland Farmers' Club held last month, Mr Finlay Dun read a paper on "Some of the Principles concerned in the Breeding of Stock." He commenced by adverting to the famous character of our stock, and in proceeding to speak of the necessity of upholding that well-earned fame, he said:—

One of the most notable and generally recognized principles of stock breeding was expressed in the familiar axiom "like produces like." The most insignificant plant produced plants the fac-simile of itself, and experienced flockmasters and attentive shepherds could readily distinguish lambs descended from particular rams. Not only were the good qualities of parents transmitted to their offspring, but faults, imperfections, and dis-

Amongst cattle, good milking pro- s, difficult calving, tendency to puer- fever, and many other diseases, were .ted both from the male and female ts; and frequently, amongst thorough- stock, the chestnut colour of some of)ld stud horses cropped up. From ance, and still more often from a penny- and pound-foolish policy, sickly and ite animals were used for breeding pur- . The practical conclusion from these ises was obvious. Both males and es intended for breeding purposes be well formed, suitable for the pur- for which they were intended, and ind and vigorous constitutions. In the ling of stock, the progeny not only re- led their own immediate parents, but called back or reverted to by-gone ations; and it was difficult to say for nany generations old peculiarities would iue to crop up. Shorthorn authorities nded four distinct crosses of accredited as the minimum amount, without which iimal could be regarded as of sufficiently descent to be admitted into the "Herd ." It was evident that the more in- t or family characters, rather than the ental or individual ones, were more :ularly transmitted from the parents to offspring. To ensure definite results in ing, the pedigree and antecedents of)arents must be known; and in this was the transmission of desirable char- ; certainly secured. In the successful ling of sheep, the importance of using)red rams of established and fixed char- s is now generally admitted by all in- :nt flockmasters. The laws of variation also be considered. Nature was so se in her variety, and so fertile in her rces, that mere slavish copies were produced. Although to the super- gaze, animals and plants appeared ical, the variability of each was great. But the law of variability n evil as well as a good aspect. Whilst e one hand there was unfortunately a ncy to increase of size, and vigour, and y, there was, unfortunately, on the other a like tendency to weakness, to de- terioration, and to infertility. It therefore behoved stockbreeders to be more careful than they were to choose the most desirable variations. Care should be taken to avoid extremes in the breeding of stock. No dependence could be placed on the union of animals possessing dissimilarity of size, of type, or even of colour. The produce of such unions was irregular; sometimes following one parent and sometimes the other, while they were apt to develop the bad rather than the good qualities of each. The practice of breeding "in and in" had been successfully pursued with some of the best race horses of former days; while in the pedigree of the best shorthorns the close breeding of some of the most celebrated animals was apparent. Breeding "in and in," when carefully, rationally, and occasionally pursued, had certainly the merit of improving the quality, style, and neatness of the stock, and perhaps, also, of giving fixity and prominence to any good qualities; but wherever excessively or in- judiciously pursued, it brought many evils in its train. The relative position of male and female in the development of their offspring had given rise to much speculation and discussion. At one time it was believed that the female exercised a passive influence only; but there was no doubt that both parents contribute tolerably equally to the development, although certain parts of the organism appeared to be more especially moulded by each parent—a fact first clearly pointed out by Mr Orton, of Sunderland, in a most interesting paper pub- lished by him in 1854. According to this view, the male impresses more especially his character on the bones, skin, external con- figuration, and limbs; whilst the female con- tributes more particularly to the internal organs, the temperament, and disposition. In other words, the male gives the external or locomotive organs; the female, the in- ternal or vital organs. From this law, two important practical deductions might be drawn:—(1). Never to use male animals of faulty form, or with weak, badly-shaped, or diseased limbs; and (2) never to use for

breeding purposes females with narrow, contracted chests, weak loins, or delicate constitutions. Prepotency of particular breeds and of particular animals, was worthy the consideration of the careful breeder. Prepotency occurred in either sex, but was usually most developed in the male. Amongst horses, some of the best thorough-bred families, and shorthorns amongst cattle tribes, were notably prepotent, and when crossed with Herefords and longhorns, speedily wiped out, as it were, their specialties. Not only was the habitual and dynamic state of parents transmitted to their offspring, but he had noticed that the produce of worn out mares and cows shewed constitutional debility, and were difficult to rear. The crossing of different varieties of plants and animals was sometimes of great importance to the agriculturist. Amongst the domestic animals, the first cross between somewhat remote families of the same species answered well enough, the offspring surpassing the parents. It was, however, difficult to go on breeding satisfactorily from such cross-breds. The first crosses between the shorthorn and West Highland or polled cow were generally admirable butchers' beasts, following the sire in size and precocity, and the dam in hardiness as well as fine quality of meat. But with neither of the parent stocks did those cross-breds pair satisfactorily. It required at least four or five generations of judicious crossing and liberal drafting to obtain the uniformity of either of the parent breeds. The careful matching of different varieties of animals, with subsequent judicious selection, had evidently been the means whence had been produced some of the most valuable domestic animals, such, for example, as the race horse and Cleveland bays, the Galloways, the shorthorns and Herefords, and within the present century, the Hampshire, Wiltshire, Shropshire, and Oxfordshire Downs. In judicious and practical hands, extreme crossing had occasionally been serviceable; but the produce of many of the earlier generations were by no means wanted, and required to be weeded out.

HAYMAKING.

THE return of warm weather, after the long ungenial course of easterly winds, may have some influence on the late crops of grass; but where the fields were shut up early, and the clover and grasses are fully in flower, there is no use in waiting, as what is gained in bottom is lost in top and quality. After a certain time, viz., when the seed is being formed, the soluble juices become gradually converted into insoluble fibre, and the feeding quality of the hay is much reduced. Those who market their produce are aware of the importance of early cutting, whereas the arable farmer who does not sell hay is often either so ignorant or careless as to half-spoil his crop by leaving it till over-ripe. In the same way, the science of haymaking is best understood and most carefully attended to in those localities where the crop is most valuable, and no reasonable expense is spared to secure as much as possible dried grass rather than bleached hay. The grass farmers in the neighbourhood of London long enjoyed a reputation for their skill in haymaking; the great secret of success consisting in the continual moving of the grass, so that, however scorching the weather, it was never left to bake and bleach on one side. Immediately following the mowers, the hands (*literally* in some parts of Yorkshire) throw out the grass, taking care to break every lock. Depending upon weather, it was either lightly thrown over again so as to reverse the face, or else got into hacks with the rakes preparatory to being put into little bunches or grass cocks, from which point it was brought into closer

quarters at each operation. In fast weather the grass mown overnight would be in grass cocks before it was left. The second day would see it thrown from the grass cocks lightly into beds, and most carefully turned preparatory to being made into medium-sized cocks; not bundled and rolled up together as we have sometimes seen, but made with care and left light, so that the air can penetrate; and when the dry grass is thus put together with the sun in it, the process of haying goes on quite as rapidly during the night as in the day. The ground was carefully raked, the bottoms of the cocks cleaned round, and everything left so tidy and shipshape that the least damage would follow a shower of rain. On the third morning an early and careful examination of the cocks should be made whilst the dew is still on the ground. We shall be amply rewarded for our industry; the aroma is most agreeable, and there is a freshness and beauty about an early summer morning never forgotten by those who have experienced it. It is now under the influence of the moistened surface that we can best judge of the progress of our grass towards the stack. A good and safe test is the presence of juice in the stem. If we take a lock and twist it tightly into a rope without moisture exuding, it proves that the juices are sufficiently dried; if, on the other hand, moisture exudes, more time is required. It will be very good weather for making to allow of the grass being stacked on the third day. In very bright and quick weather the the inexperienced make mistakes, being deceived in the apparent dryness of the crops, whereas it is only scorched on the surface, and the juices undried will make the grass come again when put into bulk. Hence it is an old saying that more hay is spoiled in fine than in wet weather. We believe that the early morning examination would prevent many mistakes. Supposing, as is probable, that more time is necessary, the cocks must be thrown out as soon as the ground is thoroughly dry, taking care to bring about three into one bed, so that when the necessary drying has been effected, the whole may be put into one large carefully made cock, and either carried out of cock on the fourth day, or first thrown over, so as to dry the bottom, which comes in contact with the ground.

Such is a sketch of the practice formerly pursued in those localities where hay is most valuable. The cost or scarcity of labour now necessitates the use of machinery. Thanks to the perfection of mowing machines, hay makers, and hay rakes, half at least the labour is saved, and the work is done most creditably. It is very seldom we can make machinery actually as efficient as manual labour. The success lies in the reduction of cost consequent on the greater rapidity of execution. The mowing machine is perhaps the most perfect machine introduced into farm practice, because it actually cuts closer and more evenly than the best scythe-man, and when it is remembered that each machine represents the force of from eight to ten lusty men, the economy in such power is manifest. If the land is well manured and the seasons are favourable, we may look for a crop whether we cut with a machine or a scythe. It is not within the compass of our present limits to go into the question as to which is the best machine; and indeed such is the perfection that has been arrived at, and so keen the competition, that we are tolerably safe in dealing with any of the leading makers. If our land be rough and uneven, we must consider strength rather than lightness; when the ground is well rolled and level, we may use a lighter machine.

The hay spreader is quite as important as the mower. This is a much more antient invention, which, however, has been greatly improved of late years. Formerly, the teeth or forks revolved only in one direction, viz., the reverse of the driving wheels, and the only action was to take the grass underneath, throw it overhead, and leave it scattered behind. This is still the first and principal operation, and the only way in which a heavy crop can be properly distributed and divided; but after the grass has been partially withered, it becomes, especially the leguminous plants, somewhat brittle. A second throwing about would cause considerable loss; hence the back action becomes of great value. The

gearing is altered, and the teeth revolve in the same direction as the main wheels, and so the back part of the tines comes in contact with the grass, which is pushed up, partially turned over, and left very light. Now, if these two observations are carefully performed, we venture to assert that the result is nearly equal to hand labour in efficiency, and effects a great saving of labour; a lad and a strong active horse will go over 10 acres of a heavy crop per day. Comparing machine work with hand labour, the haymaker is put across the swathes cut the day before (it is quite as well to lie a few hours as cut, if the weather is fine), and after lying three or four hours, it is subjected to the back action. The weather being settled, it may remain, thus lightened up, all abroad during the first night. As soon as the dew is off on second day, the grass must be put into rows by the horse rake or hay collector. The modern rakes are adjustable as to the angle of their tines, and hence are qualified to act either as hay collectors or as horse rakes proper. Formerly, if they raked well, they gathered up the dirt, stones, &c., and spoilt the hay; hence they were not much used. The hay is now put into rows, women follow the collector, and break out the rows into light beds, in which the grass makes very fast.

This is the last assistance we can expect from the machines, and having aided us so far on our way, the remainder of the work, viz., the cocking—first into medium and then into large cocks, with the intermediate beddings, &c.—is comparatively easy. When a large area has to be dealt with, it is important to keep the work going on in regular stages; thus, in our own case, with 120 acres of park to make, we like to cut down from 30 to 40 acres, putting on two machines, and as soon as we begin to lead, endeavour to cut each day as many acres as we can clear. The work is thus well in hand, and in the event of bad weather, we have less exposed. It is a dangerous practice to get too much down. We have known grass spoilt in the swathe, quite black and fusty, while the uncut portion, saving from age, was little affected. In some moist situations, in Ireland and the north-west counties of England particularly, so succulent is the grass and so precarious the weather, that the practice of summer ricking becomes almost a necessity, and is justified by experience. The work entails extra expense, and a certain quantity is injured; but it is the only safe system, and therefore to be strongly recommended. The plan is to put the hay into small round stacks, coming to a point at the apex, the produce of 1 or 2 acres in each. A sweep is used to collect the hay, which has been previously rowed up into convenient rows. The sweep consists of a frame-work in three parts, jointed, and reversible; a boy rides on and guides each horse. In this way a quantity of hay can be got together much more expeditiously than if it had to be loaded into and unloaded from carts. The hay remains three or four weeks in summer ricks, during which it passes through a fermentation, and may safely be put into a large stack afterwards. The quality of such hay is not so good as that which is put at once into the stack; but by choosing a fine time, and taking pains to mix the hay well on the stack, sprinkling a little salt over it, we shall get very good stuff. And there is this advantage, viz., that chimneys are not required, and hay is always spoilt adjoining an air-hole.—*The Field.*

THE SPITTAL IRRIGATION FARM.

LAST season 11 acres of land, between King Street Road at Spital and the Links, belonging to Mrs Knight Erskine, of Pittodrie, which has been laid out for the purpose during the previous winter, were brought under sewage cultivation with very satisfactory results as regards the crops raised. And this year, under the care of Mr G. F. Cruickshank, factor on the property, a much larger extent of land has been prepared, and is now either cropped, or in process of being so, on the sewage system. The newly laid-out ground is immediately northward of the 11 acres cropped last season, and extends from Ladymill, King Street, down to the margin of the Links. The extent is 36 acres, making in all a sewage farm of about about 47 acres.

The additional land to which we have referred has been laid out in accordance with a plan prepared by Mr George C. Roger, C.E. In the case of the smaller section laid out last year by the late Mr Anderson, C.E., the work was done by "day labour." This year Mr Roger issued specifications and readily found a good contractor to work them out; and the result thus far has been a very decided pecuniary saving with no less satisfactory workmanship. The newly laid out land is intersected lengthwise by a public road leading from King Street up the Old Town Links; and five service roads have been made, dividing it into six fields of manageable size; each of which is, of course, subdivided by branch carrier drains, and waste water runnels, for the purpose of flooding the several plots—the main carrier which supplies the whole passing along by the side of the public road.

In laying out the land, the first thing to be done, after having it all thoroughly furrow-drained and trenched, was to proceed with levelling and formation of carriers. In addition to having the levels very carefully taken and marked on the plan, the sewage was brought gradually forward as the work progressed, and as each plot was formed and the sluices adjusted and fixed, it was turned on. This served the double purpose of testing the levels, and administering a forcing manure to the newly stirred soil. From the care taken at the outset in taking levels, no difficulty whatever occurred in irrigating the different plots, though in numerous cases the flow of sewage from the main carrier turns either to the right or left, as may be wished, at the same point. The main carriers are laid with tiles fastened with cement in the bottom, which is rendered necessary by the rapidity with which the sewage water flows through them; in the case of the branch carriers where the descent is very little, and the flow sluggish, an open trench simply is required. The main waste water channels have been so arranged now that the waste water from the whole 47 acres is brought to a point in the Powis Burn at the extreme north-east corner.

In the laying out of the land, Mr Roger has kept clearly in view—what we think is a very important element—the conditions of soil and climate, and the character of the crops grown in Aberdeenshire generally; his practical knowledge of local agriculture enabling him to adjust operations accordingly. Some 6 acres have been sown down in Italian rye-grass, the plots occupied in this way having been earliest prepared, so as to lose no advantage in giving the young plants a start. Next, about 10 acres were planted in potatoes, which are just now coming into vigorous leaf. About 2 acres of Swedish turnips have been sown; and the remaining part of the land will be laid down in common turnips and other green crop.

The whole of the 11 acres irrigated last year have now been put in grass, of which there is a vigorous crop. A first cutting has already been taken off of a small part; and we may say there is quite a ready sale for the grass when fit for cutting.

In regard to the cost of laying out the

land now being brought under irrigation, in relation to probable returns, it would be as yet premature to speak. As we have frequently said in reference to the general question of sewage utilization, experience in each individual locality where sewage cultivation is attempted, must be a main element in directing to satisfactory results, whether as regards cost in laying out and management, or the proper crops to be cultivated. In the present case, as we have indicated, a material saving has this year been effected in the matter of laying out. And in that respect, as well as others, the results on the Spital Farm will, we expect, by-and-by, form an important contribution to the solution of the general question of sewage farming in so far as Aberdeen is concerned.—*Aberdeen Free Press.*

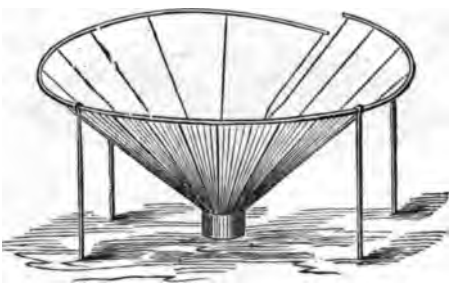
SEWAGE UTILIZATION.

MR Mechi writes to us, describing a visit on Thursday to Mr Hope, Breton's farm, at Hornchurch, 3½ miles from Romford, from which town all its sewage flows through an 18-inch iron pipe, Mr Hope paying to the town 2s. per head, or £600 per annum, for 6000 inhabitants using closets; and the cost to the town of raising all the sewage 25 feet at Mr Hope's farm is, including coals, engine-driver's wages, and interest and wear and tear of engine, about £300 per annum. Mr Mechi says:—"My last visit to this farm, as recorded in your columns, was in September. Ever since then, in all weathers, the sewage has flowed constantly on the land, which consists of 120 acres of poor gravelly and sandy soil with occasional veins of stiffer soil. I saw the engine-driver and farm men looking as healthy as need be, although he and the four sewage regulators are for ten hours a-day in almost immediate contact with the sewage. There was the black sewage flowing over the land, and, after passing through it to the drains, 5 and 6 feet deep, coming out as clear as the finest spring water. The day was very warm, so we all had a hearty draught of it without any inconvenient result. Mr Hope uses it over again mixed with the sewage, except when there is heavy rain. It thus appears that, in his case, the flood or rain water mixed with the town sewage does not over-dilute it, although the question is arising whether the sewage and flood waters of towns and cities should not be separated. I presume that would depend upon the nature of the soil to which it is to be applied, and also to the amount of town water supply. Every crop on the farm was looking the picture of healthy and abundant growth, and it was wonderful to see French beans growing on a portion of the land that was almost pure gravel. The temperature of the sewage during frost being many degrees above freezing, the irrigation after a night's frost melts the ice in the ground and enters the soil. Onions, carrots, cabbages, potatoes, strawberries, &c., were all promising, and a second cut of Italian rye-grass 2 feet to 3 feet long gave unmistakable evidence of the value of town sewage as a producer of food for man and beast. We are very much indebted to Mr Hope for permitting, so liberally, a view of these interesting proceedings. The Romford sewage amounts to about 250 gallons per minute, average of day and night. The engine, therefore, puts on about 600 gallons a-minute for ten hours. The engine-driver has 4s. a-day, and the engine consumes 11 cwt. of coal per day. The parish authorities attempted to rate Mr Hope on the amount he paid annually for the sewage, but on his saying that he was content with this provided they rated all the other farmers and market gardeners on the cost of their manure, they saw the impropriety of it."—*Times.*

The Garden.

CATERPILLARS ON FRUIT TREES.

CORRESPONDENT of the *Albany* ʟ *Cultivator* destroys these insects dly when too abundant, by a simple conıce of his own. It is constructed somet on the plan of a reversed umbrella. : accompanying figure exhibits its appeare. A large hoop, some 8 feet more or in diameter, is made of round iron , ⅜ inch in size, with an opening on side to receive the tree. It is closed as n as placed in position, by overlapping two ends. A round hopper-shaped cloth ttached to the hoop, so that the lower : may be 3 feet down, or near the ground. :he bottom is secured a tin cup, and the :cts, when jarred into the hopper, by :ing the tree with a wooden mallet, roll n into the cup. If, in very warm weather, adhere to the cloth, a slight jar or blow ens them. The cup should hold several rts, so as to secure all that fall into it, ıding the dead blossoms, &c., which ld soon fill it when too small. The insects will remain without attempting to escape, so long as it is kept in motion by passing from tree to tree. The four iron legs hang on the hoop, by being looped around it. They are sharp below, and are easily thrust into the soil to give firmness to



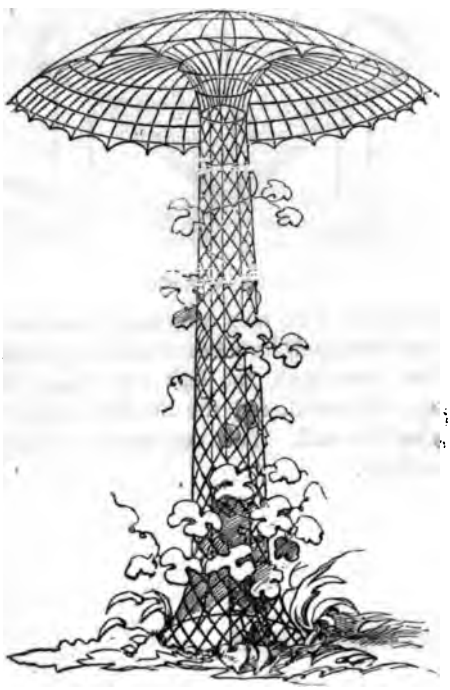
Trap for Caterpillars.

the hopper. Two men carry and operate with it; and thousands have been caught in an hour. When done with, the legs are folded, the hopper flattened, and the machine hung up against the wall. This contrivance answers admirably.

WIRE DESIGNS FOR CLIMBERS.

BOUT all gardens, and small gardens ʟ in particular, there is a desire for some ıamental frame-work to train climbing ıts upon. In days past, we had extensive ıes or bowers, generally covered with ;es, or Clematis, or Honeysuckle, or Virian Creeper. Now, there is not such a :y for covered walks of that kind. Often r were designed in rustic wood, and a r pretty effect they had with such plants 're have named above, and with others of even more common character, such as the common Hop (Humulus lupulus), and the common Ivy (Hedera Helix). Doubtless, fashion will revert to some of these old-fashioned but very pretty systems of exhibiting climbing plants, and we would not be sorry to see a beginning made now. In modern flower gardening, the disposition has been all along to banish so much of the picturesque as these quaint arbour-looking structures put on. All must be to the nicety of

geometric lines, else it was reckoned a blot. Now, we do not quarrel with geometric lines, we like to see them in proper places; but we like to see also a little of everything in its proper place. There are few places of any size in the country where one or more styles of gardening could not be carried out with propriety, and not be out of keeping with adjoining objects. Even in a modern design, on the closely-shaven parterre, this little bit of standard work might be set in, not on sufferance, not at a disadvantage, to the squat forms of beautiful flowering or foliaged plants, but to a manifest advantage. We never were in love with a too severe rendering of the



Wire Design for Climbers.

geometric and the gardenesque styles—that is, with the filling of them with certain plants to the exclusion of others.

We don't want an infusion of mixed herbaceous plants; we don't want disorder, or an approach towards it, to offend the æsthetic eye; but we want the severe *ground* form to be modified with varied lines. This design in wire would do well for a centre-piece to the little flower gardens of villas, or it might form a subsidiary object, where statuary, and fountains, and evergreen formal trees, were present, as they always are, in model gardenesque designs. This frame work would do very well for any of the Ayrshire, Hybrid, China, Boursault, Banksian, or Evergreen Roses. Were Roses not present in the design, then it could be very well done with the Canary Creeper (Tropæolum canariensis), or with such a fine climbing and effective Nasturtium as Tropæolum Bothwellianum, or any of the T. Lobbi section of seedlings, which now count by scores. Best of all, however, we would prefer seeing it wreathed with one or more of the beautiful Clematises that Jackmann and others have laboured so successfully to get. Even the old C. viticella is a lively shade of blue, and is so free flowering and free growing as to compel admiration. But when we have such a wonderful addition of really excellent varieties, crossed between Japanese and other species, we are apt to forget some of the older and interesting species. No one can forget who has seen once the sweet-scented flammula, which forms quite a sheet of white blossoms, and is as fragrant as the Hawthorn. Of course, we must not forget to name Jackmanni, the most beautiful of the tribe of Clematises, which rewards the grower with a profusion of azure flowers during summer, up even till the early days of November, if frost in some severity does not interpose. Then there is C. rubro-violacea and lanuginosa, both excellent plants for this kind of decoration, and flowering in good positions quite in sheets of colour. Let us have, therefore, a little more of these wire and other designs, to raise up our beautiful flowers from the ground, and present them climbing up, serpent-like, in their stems, but only to unfold a drapery of inflorescence that looks well, and enhances, in decorative effect, everything in the floral or foliage way with which these designs are associated.

FLOWER VASE AND PEDESTAL.

A LITTLE of the ornamental in stucco, or stone, or marble, or of the various compositions of which the many designs to captivate the human eye are constructed, is a pleasant addition to the flower garden. As we long to see flowers in a variety of forms and of colours, so do we also wish to see them at different elevations. Some plants look best beneath the eye, others on a level with it, and others above it. Some, again, may look

Flower Vase and Pedestal.

well in any position, but there is a craving intuitively engraved in the character for variety. What may look well enough this year, or indeed any year, may not quite please the fastidious taste the year following, and ingenuity is brought to bear upon the matter, and new positions are selected. It is well that it is so. We cannot always be wearing the same dress, or dining off the same fare, or going to the same summer quarters, or fishing in the same stream, or hunting over the same ground, day after day. We like a change. If we can afford to gratify our desires, it is done; if not, not. We cannot, however, change the form of vegetation; we may dress it, and clip it, and train it, but the plant will always, wayward like, assume somewhat of its natural habit. It will not belie its characteristics of growth, or flower, or foliage, All we can do, therefore, is to alter its position, give it new associates to contrast with, and a new home to live in. Pelargoniums look well in the ground in almost any position, and trailing plants can be pegged along the ground, and their flowers will look up to the great source of light, and reward the observer's eye at the same time. But when we have a handsomely designed vase set on a nicely proportioned pedestal, the Pelargonium will look none the worse, and it will please its owner all the better, that it is fitted for a variety of ornamental purposes. Vases, then, are proper furniture for all out-door gardens, and some varieties of them are also suitable for in-doors. A vase of this kind, filled with a mass of scarlet Pelargoniums, and draped with the Ivy-leaved species, or with Lobelia, or with it and Gazania splendens mixed, make a very good object—better, indeed, than if too great variety were introduced. We like the simplest form of decorating these summer out-door vases. It is more effective, and more unbouquet-like, which is a proper disposition of either floral or foliage decoration. Possibly, the most exquisitely decorated vase we ever saw was filled with the old Tom Thumb Pelargonium, with an outer edging of Saponaria calabrica. The orange-scarlet centre, and the flowing pink tresses of the Saponaria, were about as grand and simple as could well be imagined; and it told well, high above the ground beds, both distant from and in close contact with the eye. Let all villa gardeners, therefore, not fill their vases with a miscellaneous lot of plants, as bouquet makers make up their bouquets. Select, at most, three or four good subjects, and the effect will be vastly more decided, and much more pleasing to the general spectators.

WEED EXTRACTORS.

MANY people are pested with weeds of all kinds in their gardens. Annuals are easily extirpated by the Dutch hoe, perennials are not quite so readily disposed of. Many of these perennials, such as Dandelions (Leontodon Taraxacum), Docks (Rumex palustris), and Thistles (Carduus tinctorius), have so long tapering roots that the usual scarifying process of hoeing is only a temporary remedy. Cut either of these 1 inch below the surface, and the root sends forth other shoots, which grow apace and annoy those who wish to be orderly in every thing. Weed extractors of a different kind are needed to extirpate these perennial weeds once and for all. But if the process be too long delayed, if flowers are allowed to expand, they are so prolific in their seed-bearing tendencies that they will soon infest a whole district. The slightest friction of wind will waft either the Thistle or the Dandelion far from their seed-bearing parent, and thus early action will save much labour. It is very annoying to be placed in a district where fields or waysides covered with these indigenous plants are contiguous. All the labour of cleaning a pet piece of garden ground has to be repeatedly done over, as the seeds get wafted about, and plants grow up under the influence of summer heat with great rapidity. Even where lawns are not well kept, there the Dandelion will spring up, and jostle out of existence many of the choice slow-growing grasses. All diligence should be exercised to keep down any of these tapering-rooted plants. Two forms of weed extractors are here represented; fig. 1 is the better little requisite for levering-out larger plants. It is fitted with a longer handle, and is stronger looking than, although not so powerful as the one to which it is allied, fig. 2. In this implement, the fulcrum is made separate, and joined to the iron weeder, and can be wrought with great ease. It is useful about beds or lawns for extracting Daisies or Plantains, more popularly called Rib-grass (Plantago lanceolata). Fig. 2 is made of flat iron, the iron bent to form the fulcrum, and placed into a wooden handle for convenience of the party using it. It is fully as light to carry about as its fellow, and can be used for extracting the weeds spoken of in gravel or any other position. Both are handiest for small plants of these weeds. The larger ones require a stronger implement to extract them.

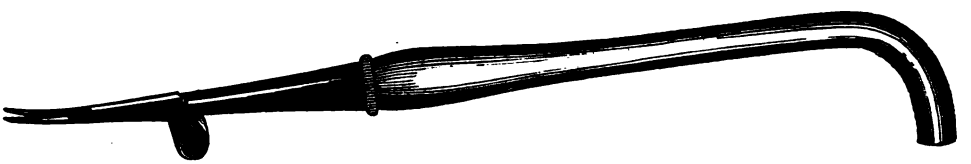


Fig. 1.

Fig. 2.

GARDEN ENGINE AND WATER DISTRIBUTOR.

THE engraving represents a garden engine of the kind, suitable for washing and rinsing fruit trees of all kinds. This is the sort of requisite in demand, for keeping under the army of insects and other diseases that infest plant life. An engine engine can scarcely be plied too often to rid

Garden Engine and Water Distributor.

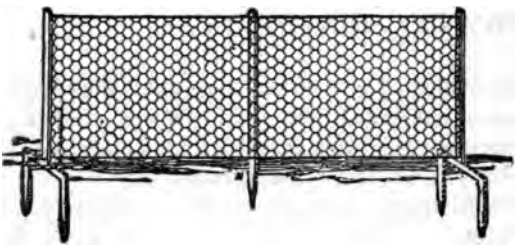
a garden of larvæ of caterpillars, and of the perfect moth. This is one of the powerful sort, that does not readily get out of order, and that is an important recommendation in its favour. It is provided with additional fittings that make it more serviceable, in having a distributor for watering walks, or it might be used for lawns, where water is not provided by gravitation, and where the hose was not called into play. Many gardens now have all these conveniencies, others have not; and in such the portable easy way of distributing water is a very considerable gain.

Such an engine with its varied appliances would be a boon in the hands of many. To all who care about being at the expense, we say, use this fearlessly against the wall and standard trees, and if you have a mind to keep your walks and lawns in the pink of order, you can manage to do so, by using the water-distributor, during a season of drought.

HEXAGONAL WIRE NETTING.

WE submit the following pattern of honeycomb wire netting as one of the most suitable game-proof hurdles in the market. It can be used for a variety of purposes, more especially as it is suitable for the protection of a flower garden where there is no wall or opaque fence of any other kind. Usually, we see them not quite so substantial looking as it is desirable to have, from the imperfect supports to which they are fastened. In our engraving, at every 6-feet length there is a two-pronged iron standard which holds the fence good against game of all kinds, and is sufficiently

strong for sheep. The centre support between the pronged standards gives it additional security, rendering it comparatively free from



Hexagonal Wire Netting.

getting uneven. While it is a useful fence, it is also an ornamental one. It is much used in large policies, where it is an object to shut out the game in the general pleasure grou from the choice flower garden or parter It is also used where hedges form a boundar The latter are generally good enough fenc for cattle, but game find their way throu the openings on the ground line, and oft commit depredation among the choice plan A wire fence of this kind commands t desired security. Some ornament these fenc with training climbers on them, and ve suitable ground work for training they a Others prefer to keep them nicely painted either way is eye-pleasing. To all who quire such fencing, we would recomme them to adopt something after this style, it has neatness and durability to recommend

NEW AND RARE PLANTS.

THYRSACANTHUS RUTILANS.

FROM time to time, we intend noticing some of the beautiful plants that have been introduced into cultivation, irrespective either of their novelty or their rarity. Properly speaking, some of them might come under the category of *neglected* plants; others may be rare, but all we shall select will at least be notable. In the rage for novelty, there is a disposition to be led away from a just consideration of old and familiar plants. This cannot be countenanced by those who ask justice, and a fair and equitable consideration of the merits of the old as well as the new. We do not mean to discountenance novelties—far from it—only we wish to lay before our readers a delineation and description of such really eligible plants as Thyrsacanthus rutilans, and the subjects that follow, that the novice may really have some idea of what the plants look like, and what are the conditions necessary for flowering them, and keeping up a respectable healthy appearance.

Among the most ornamental plants that were once popular but now much less so, is he beautiful and elegant subject of our engraving. Thyrsacanthus rutilans, wh offered first to the public within the last twe years, was the subject of much attention, a commanded no little admiration. As ti wore on, it was less and less seen in our pla stores, and now it is even pressed out, not the full catalogues, but of those having a l of selected plants. Why it should be so, are at a loss to understand. There can no good reason for discarding it from an namental point of view, for its grace drooping racemes of scarlet flowers are abc as elegant and showy as can well be imagin Indeed, among the whole race of tropi flowering plants, it has not a single eq for the temporary decoration of the dini table, when it is under a high state of cu vation. Many, for want of success, that not spirited enough to persevere, have allow it to die off in their hands, and thus th have influenced others against it. Give plant a bad name, and it is scarcely in better position for safety than the dog. Tr the Thyrsacanthus is not so free growing plant as many. Moreover, it has a dispo tion to shed its leaves as it grows upwa and so, when the flowering season con

Thyrsacanthus rutilans.

d, it is quite unlike the engraving. The s, instead of assuming the character shewn, are all shed to the little crowd at the extremity of each shoot. In the state it is not so fitting a plant for decoration, as one would desire to see it, still it is even

a showy, eligible plant then. This non-persistency of the foliage has had something to do with the plant losing a character, which it readily received when first shewn. It is also very subject to be infested with scale. This insect is a great pest in hothouses and where plants of an exotic character are grown generally. When, how-

Cypripedium superbiens.

ve have such a useful specific as Bos- *Ne plus ultra*, no one need be at a or keeping insects under without dan- the growth or appearance of the plant. ese accumulated ills, as we have already told against the popularity of the acanthus rutilans, and we wish now to how they can, in a measure, be met. ave already given an excellent specific ale, or *coccus*, of any kind; and now ve to take measures to guard against non-persistent leaves. Get healthy plants to begin with from the nur- Place them in the mild moist atmo- e of an intermediate stove, not too or yet too cold. A happy medium is esideratum. Let the pot in which the is growing be plunged in leaves, or tan- or gravel, or sand of any kind, to give e more ground than surface heat, and to nt too great fluctuations from a drought isture point. It will grow away vigor- and require during the season a little growing space. Repot carefully in a compost, with sufficient sand, and fibre charcoal, to maintain agood physical Pinch out the leading growths to give nched character to the plant, and don't it to flower the first season after it has made to take on responsibility on its account. Keep the plant quiet in r—that is, do not give it either too heat or too much moisture till spring is. It only wants light, and a minimum erature, of say 50 deg., not to impair the itution. Early in spring, it will reward grower with flower racemes, quite as ful as represented in the engraving, he foliage will not be destroyed as in r neglected plants. When done flower- row the old plant on in heat, to get cut- from. So soon as this is done, throw it the rubbish heap. It is no advantage empt to grow it on a third year. If the r wishes heathy nice plants, treat this as a biennial, and do not allow it to ne sere-looking through inattention by rious checks which plants in general bmitted to, as all the attempts at cor- rection afterwards turn out but only a partial remedy.

CYPRIPEDIUM SUPERBIENS.

Chief among the bearded Lady's Slippers is the striking Cypripedium superbiens. It is one of the many fine plants discovered by Mr William Lobb, while collecting for the Messrs Veitch, in Singapore. He discovered this species on Mount Ophir. Although introduced into the country in 1858, it is yet one of the rarest of our Lady's Slippers. That it is singularly beautiful, few will deny. It has foliage very much like that of the common bearded Slipper (C. barbatum), but the ground colour is paler, and the blotches more vivid and distinct. Looking at the flower, the dorsal sepal is broad, as the engraving shews, and is white with lines of pale green, running into a browner hue towards the base. The inferior sepal is of like character. The petals are the most effective portion of the flower, indeed, they give it a prominence which has enhanced its value in the market. They are lanceolate, slightly undulating towards the extremity, of a white ground colour, with brownish green lines, upon which are planted numerous sanguineous spots. The edges are distinctly hirsute, and contrast well with the gouty slipper-like lip. This, like C. barbatum, is dark shaded brown, but much more inflated. The whole of the family of flowers are very persistent, remaining good for three months, in a proper temperature. This one in question we find agrees better with the warm, moist, intermediate temperature of a house kept so, than it does in severe sweltering tropical Archipelagan climate, shewing that its native habitat is evidently at a higher elevation than the flat swamps of Java or Borneo. Growers will find it advantageous to place a few bits of charcoal, and a lump or two of chalky lime in the fibry peat and sphagnum, generally selected as a compost. In this, and under the temperature we have described, near the light, but shaded from the sun, this will grow far better than we usually see it.

Prunus Triloba.

PRUNUS TRILOBA.

Were we asked to point to a novelty that ould prove specially welcome to all gar-eners, we could not name a better one than ıe subject of our engraving, Prunus triloba. indley was in ecstacy about the plant when rst sent home by Mr Robert Fortune, and ıose who cultivate it now will endorse what ıe Doctor anticipated. It is quite hardy, owing in our pleasure grounds quite as eely, we presume, as is to be seen in its ıtive home in China. It is a species of lum, flowering in March and April. The dividual flowers are by no means exagger-ed. In some places, the shoots are ɔt so thickly clad with flowers, but there ın be no question that this is a worthy as-ɔciate of the double-flowering Cherries Cerasus vulgaris flore-pleno). Like the double Cherry, the flowers are button-like, although not quite so much or so perfectly double. It is a very distinct plant, and worthy of extended cultivation. The flowers differ from the common Plum (Prunus domestica), in having two, three, or more ovaries, as one writer says, "which distinguish them from the other species of Plum, which have never more than one ovary in each flower. The branches are clothed with clusters of bluish or pale rose-coloured flowers, forming them into garlands. The flowers are what is called semi-double. The young green leaves dispersed among the flowers, give them additional effect. It was these young leaves which suggested to Lindley his specific name of triloba, but the three lobes disappear almost entirely as the foliage is developed."

Work in the Garden during July.

From "THE VILLA GARDENER."

THE VINERY.

MAINTAIN a moist growing atmosphere and a temperature of 65 to 70 deg. at night, with a rise of 5 or 10 deg. during bright days. The house may be shut up between four and five o'clock in the afternoon—that is, if it faces south, as most vineries do. But if west, it must not be closed on bright days till 6 o'clock. Give 1 inch or more of ventilation at the top between six and seven in the morning, before the sun hits the house. Great evil is wrought in the way of scorching the leaves and injuring the Grapes, by allowing the sun to raise the temperature within the vinery, before any movement of the air is effected by ventilation. Tender, that is, fast growing, leaves fringed with delicate drops of water, like ropes of pearls, as the foliage of Vines in well managed vineries during the height of the growing season often will be, are readily scorched in a stagnant atmosphere. If it be gently agitated, the water is partially dried up and the danger of burning removed. A moist regimen is not only the best for fully developing the fruit, but likewise for preventing red spider, one of the greatest pests to inexperienced Vine growers. It can hardly establish itself in a genial atmosphere. Dry, hot air seems to develop, as it undoubtedly strengthens and multiplies, red spider. It appears on the under sides of leaves, in almost invisible hosts, and lives and fattens upon their nourishing juices. If the leaves exhibit reddish specks, partially hidden by a minute and almost invisible web of the most gossamer texture, be sure the spider is there, and hasten to smother it with dry sulphur, or, better still, choke it with sulphur fumes. The sulphur must on no account, however, reach the point of ignition, else it will destroy every leaf within the house. The safest way to apply it is to convert it into a thick paste with water, and smear the surface of the hot-water pipes with it. Then put a brisk fire on at night or during a dull day, and keep the house as close as possible while the strength of the sulphur is being carried by the heat with death-dealing power to the mischievous hosts of red-coated spiders. In adopting this mode of diffusion by the aid of flues, great care must be exercised not to overheat them, and the sulphur must not be applied to the hottest end, next the fire. On flues, danger may occur at a temperature far short of visible ignition, and the sulphur remedy is hardly a safe one to apply to flues or stoves by villa gardeners. On hot water pipes it can do no harm, and is the best remedy for the pests in question. But prevention is the safer course, and by providing wet surfaces of path, borders, and walls, for the dry air to drink a red spider will be unknown.

An excess of moisture must, however, be avoide else the villa Grape-grower may call up or down worse foe than red spider. It will be small gain keep out spider if we let in Fungus or mildew. Th shews itself in blotches on the leaves, and a blac spreading, dirty-looking dust, or mould, creepi over the bunches and berries. The moment appears, or seems to appear, dust the spots or bunch with dry, fine sulphur, and paint the pipes the same for spider. Keep the atmosphere dry at the sa time, and this worst of all diseases, like the worst all Vine pests, yields almost immediately to t sulphur remedy.

Continue to stop the side or fruit-carrying branch at each new leaf formed, and allow the leading sho to ramble along without stopping. When they rea the top of the house, give them the run of the ba wall. These strong growths generate equally stro roots, and do much good work in drawing up a supp of food within consuming range of the fast-swelli berries and in keeping up to a maximum stand the general stamina of the Vines. Before the end the month, the growth of the Grapes will be co pleted, and next month the ripening process, and t treatment most conducive to the perfecting of the sa will be described.

THE ORCHARD HOUSE.

The orchard house can hardly be kept too cool a open during the month. In consequence of this t rough ventilation, many amateurs are disappointed find that the fruit from the orchard house trees later in ripening than that on open south or west wa But this is no disadvantage, but very often the verse. The chief use of a cool orchard house is to force the crop out of season, but to ensure a c at any time. By guarding against the extremes cold and heat, the blossoms and embryo fruits are p tected, and the crops matured leisurely, but surely well. By growing the largest and later sorts un glass, the orchard house fruit may be made to succ the crops from warm walls, and add a month or weeks to the end of the Peach season. Again, growing early varieties, and giving less ventilati the crops may easily be ripened a month or six we before the general crops on walls. Free ventilat is essential to the health of the trees and the certai

ıp. But its absolute amount will be largely ɔd by the time when the fruit is wanted to be Nothing is easier than to retard fruit under glass ial shading and constant thorough ventilation. ings simpler than the forwarding of it—by the ın of draughts, and the adoption of early closing. s or Apples, and Plum trees, if not previously d outside, may now be arranged in sheltered, ıuarters out of doors: so may be Cherries also ve been gathered, or all may still be left in the

In that case, very free ventilation must be to fully develop the flavour of Pears, and severe pinching back must be indulged in to the trees from overcrowding, or smothering the rith their new growths.

dressings of rich composts or mulchings of rich ɔ may still be applied to heavily laden trees that heir roots through the surface in search of fresh And every watering during the swelling period be of sewage or manure water. As soon, how- ıs the ripening process begins, no more foul nust be given. The rule in these matters is first elop size, then quality. Plenty of moisture at d bottom is favourable to size, a tolerably dry ɔhere is essential to high flavour.

THE GLASS HOUSE.

ɔp clean and cool, shade during bright sunshine ılong the blooming season of Pelargoniums, as, &c. Net the ventilating space, to exclude e bees. Water with care, giving Fuchsias and late ɔoniums clear manure water to enlarge the late , and prolong the period of flowering. Sprinkle not in bloom, such as Camellias, Heaths, &c., ng their growth with water. Remove the latter ıdy places out of doors as soon as they have their young wood. Heaths do best out of doors ımer. Young or free growing plants may now fted. Use only poor heath soil and silver sand eaths. This is different from the turfy peat, , with fibrous loam in equal portions, is the chief e used by plant growers for all sorts and sizes ɛr plants. A useful rule in potting is, the larger ecimens the rougher the soil and the less sand, *ce versa*.

ıe of the earliest Pelargoniums may be removed doors as soon as they are done flowering. To- the end of the month these may be cut down ɔnverted into cuttings, to be inserted either in illed with light soil and surfaced with silver or planted out on a small prepared border. : way, insert the cuttings firmly in firm ground. ılidate the earth around them, and drive out the making the ground level with water, and leave full in the sun until rooted. Water when dry, ; you would a rooted plant, only with more care eater caution not to water to excess.

ɛ space vacated by these early Pelargoniums ł be forthwith filled up with specimens of and variegated Pelargoniums, either in flower vancing towards it, or with Balsams, Cocks- combs, Celosias, Achimenes, Gloxinias, &c., from the hot pit or vinery.

Many almost fill the glass house during summer with Ferns, Palms, variegated Begonias, and other foliage plants. If possible, the house should be made beautiful at all seasons. Very often, where it is chiefly made a winter store for flower garden plants, it looks cold and bare throughout the summer. With a little care it might mostly be filled with sweetness, or wreathed with beauty, even though nothing better than Mignonette, night flowering Stocks, Jasmines, Convolvuluses, or other common things, were grown for that purpose. I have seen a capital effect produced by simply sowing and shifting into large pots a few of all the largest bedding plants at planting out time, and growing them on in the glass house.

PITS AND FRAMES.

Hot Pits.—As soon as Cucumber plants have nearly filled their allotted spaces, stop every shoot at every leaf made. At the base of every leaf will be one or more fruits. It is not wise to allow too many fruits to swell at one time. Six in a light 5 feet by 3½ or 4 feet is a fair average. Cut the fruit young if you wish for juicy crispness and sweetness. Water freely, and damp the leaves over every day about four o'clock, when you shut up.

Melons.—Similar treatment will suit Melons. Only these do not go on bearing in succession as Cucumbers. Having secured, say six good fruits under a light, proceed to develop them to their full size, and ripen them perfectly. For the former, encourage a free healthy growth, and preserve as many leaves as can be fully exposed to the light. The leaves should be selected as close to the swelling fruit as possible, and all weak, lateral or side growths stopped at once. A moist-growing atmosphere should be maintained until the fruit has reached its full size. To ripen perfectly, gradually dry the air, and withhold water from the roots. The change must not be too sudden, else the plants will wither or die, the leaves scorch up, and the fruit ripen before its time. Also raise the fruit up from contact with the wet ground, or a brick or pot. It should not, however, be placed too close to the glass, and it is well to let the leaves partially overshadow it, else the sun may scald or burn, and so ruin it. Finally, as soon as it smells very fulsome, and begins to crack round the stem, cut it and keep in a room a day or two before eating. Melons should never be handled by the stalk, as if good for anything, that will instantly come off to the disfigurement of the fruit.

Cockscombs, Balsams, Celosias, Seedling Ferns, &c.—Shift into larger pots, water freely, and encourage growth with a temperature of 70 deg. Propagate and grow on choice cuttings. Keep small Camellias or Azaleas close, to force a second growth.

Cold Pits.—Sow seeds of Cinerarias, Calceolarias, Chinese Primroses, for late flowering next spring. Shift small plants of Heartsease, Polyanthus, Pinks, Carnations, and sow more seeds of the same as they

ripen. Propagate Pinks, perpetual Carnations, Picotees, Phloxes, Pentstemons, Antirrhinums, Wallflowers, Rockets, and Auriculas, either by division or cuttings, and pinch in Chrysanthemums, and winter blooming Salvias, such as splendens, Gesneriflora and fulgens variegata.

THE FLOWER GARDEN.

Push forward growth by every available aid, such as watering with sewage, surface stirring of the soil, picking off each flower before it is fairly faded, or has had time to think of seed-bearing. The great object is first to get the ground covered with the plants. Few things look worse in summer time than bare earth. A free growth ensured, the second important point is almost sure to follow, that is, a rich harvest of blossom. If not, growth can be checked by withholding water, and other means. The most provoking thing about many flower garden plants is that they will flower first, if allowed, and grow afterwards. The result is a scant harvest of early flowers, and a full meal of rank shoots for the early frosts. We want as much as possible to reverse this order. Use all possible means to encourage early growth. Profuse and continuous flowering even into the beginning of winter is well nigh sure to follow. The plants need skilful culture, much care, and skilful training, for the first two months of their life out-of-doors. Afterwards, they can to a great extent take care of themselves. Of course, they must ever be kept free from weeds, fixed in their proper places, and pegged down, or tied up according to their habits, and the objects for which they are grown. Some may likewise need thinning or stopping. But these operations are simple and easy, compared to that of making stubborn or stunted plants grow freely, and occupy their allotted areas, filling them to repletion.

Hardy herbaceous plants should have their flowering shoots thinned and carefully tied. Few things deteriorate the quality of their flowers so much as the too common mode of tying up all the shoots they throw up from their root stools into one huge bundle like a Birch broom. By thinning the shoots of Phloxes, and such plants to from three to six, the spikes are much finer, and the effect more pleasing. The same rule holds good with Dahlias, Hollyhocks, and most other flowers. A good easy way of tying Carnations is to use corkscrew-looking wires for the purpose. If these are inserted early, and the growing points of the flower stalks introduced into the lower curves, the flower stems require no tying, and the effect is neat and dressy.

Make layers of Carnations and Picotees, take pipings of Pinks, and root them under Rendle's Protectors, or hand-lights. Complete the budding of Roses. Hunt for caterpillars and maggots, and soak such plants with sewage in dry weather. It can hardly be needful to add, mow short grass every week; sweep and roll gravel, likewise, once a-week at the longest, and see that neither weed, dead leaf, nor flower, nor dirt of any kind, is seen within sight of t flower garden.

THE FRUIT GARDEN.

Vines.—In many southern villa gardens Vines grown on the villa or garden walls. The you shoots will now require attention. Where there more wall to cover, let the leading shoots run recommended in houses. In cases where the sp is already covered, they can be stopped at five or leaves above the fruit. All side shoots to be stopp at one leaf beyond the bunch. Those in expos positions will need tying or nailing to the wall, e the first high wind will probably tear them off.

Peaches, Nectarines, and Plums.—Should weather prove hot and dry, the size and quality these fruits will be much improved by a daily washi with the garden engine or syringe, at from 5 to 7 P. This not only enlarges the fruit, endowing it w new life and vigour after the dust and heat of the d but it cleanses, refreshes, and strengthens the lea likewise. Moreover, if copiously syringed, the wa not only refreshes the trees once, but twice assured and it may be many times. It evaporates from le wall, and ground surfaces, genializes, as it were, local atmosphere for the trees in which they luxuria and thrive comparatively free from the surroundi aridity.

Attend to thinning shoots and fruits alike. T greatest dangers in fruit growing are an overcrowdi of shoots and an overweight of fruit. The o weakens the trees by an extreme sub-division of growing force, and the shutting out of the strengthe ing light by the darkening shadow of the branches, t other by sheer exhaustion. Leave no branch th cannot have light and space to grow without doomi its nearest neighbour to semi-darkness, and no fr that cannot have a sufficiency of food without robbi the one next to it.

These remarks are as applicable to Apples a Pears, as to the fruits named. Thin freely on cordo pyramids, &c., if you wish to have fine fruit, that providing the April frosts did not do it for you.

Stop the young wood on Apples, Pears, Cherri &c., cutting or bending it back to three or four eyes fro the base of the shoot. This removal of breastwoo as it is called, admits more light to the fruit, and oft transforms the wood buds at the base of the stopp branch into fruit buds before winter. On walls, t young wood of Peaches, Nectarines, Apricots, Plum Cherries, &c., ought to be carefully tied into proper place. Some, however, prefer leaving t young wood of Cherries growing out from the wa It is useful as a buffer to keep the nets off the tree when the birds, determined for a Cherry, fly with fu momentum against the net to bring their open mouth within reach. Fruit buds seem also more plentiful manufactured, and greater strength thrown into th wood by this mode of leaving the wood free till th autumn.

berries.—Copiously water and carefully pro-
m birds the late crops. Lay down runners for
ntations. Remove the runners and top-dress
ich manure those that have finished fruiting,
: to be left for another crop. Those condemned,
wn at once, and crop the land with winter
.

berries.—Thin the young wood from the stools
e or six shoots.

berries, Currants.—Remove breastwood care-
rotect from the birds and gather ripe fruit.
: of bruising it in the process of gathering, and
t everything that touches or comes near it,
in the garden or the store room, or in the
from one to the other, is perfectly sweet and
lously clean.

THE KITCHEN GARDEN.

, once or twice during the month, Peas, making
t sowing of all of Carter's First Crop. Sow
urnips, Lettuces, Endive, Summer Spinach,
ren Brocoli, Horn Carrots, Coleworts, and
. Plant Celery, Lettuces, Cauliflower, Savoys,
Kale, and Brocoli, as more ground is cleared
rly crops of Peas, Beans, and Potatoes. Some
nt some withered sets of the latter this month, and even as late as the next, and thus eat new Potatoes in November and December. There is still much work to be done in the kitchen garden; crops require to be thinned, weeds to be destroyed, Peas to be staked, Celery earthed up, Tomatoes thinned and stopped after they shew a few bunches of fruit, Ridge Cucumbers and Vegetable Marrows stopped and trained, and early produce to be gathered and eaten. In dry weather, abundance of water ought to be given to growing crops, sewage, if come-at-able, but if not, then soft water; and if that also is beyond reach, spring water exposed to sun and air for at least twenty-four hours before being applied.

All vegetables should be gathered in a young and tender state. Though less bulky, they are so much better and pleasanter when crisp and sweet. And if crops, such as Peas and French Beans are gathered young, the plants yield a greater weight of food than if the produce was left till it neared maturity. In the latter case, we gather but one crop, in the former many, and as "mony meikles mak' a muckle," the gross weight gathered would be greater by taking the produce young. While, as to quality, young vegetables, as everybody knows, are beyond compare superior to old.

The Veterinarian.

VETERINARY EDUCATION.

BY the Report which Mr Milward presented at the Monthly Meeting of the Royal Agricultural Society, we are informed the grant made to the Royal Veterinary College has not been productive of the useful results which are reasonably expected should come of it. The Society has a catalogue of the complaints. The objects of the grant are manifold: 1. To advance veterinary science; 2. To render the best advice and assistance to members in case of the outbreak of disease; 3. To obtain reliable information on current diseases, by means of reports, lectures, and experimental investigation; and, 4. By means of the foregoing, to fortify the centres of agricultural wealth with needful professional assistance at all times.

Mr Milward justly complains that the endeavours of the Society have more or less failed. He says, and we endorse his statement, that "The number of veterinary surgeons who have gone out from the College, and become established in the country, have not so full a knowledge of the treatment of the diseases of cattle, sheep, and pigs, as to give confidence to their employers." We need not, however, wander far in order to obtain satisfactory reasons for such a state of affairs. Country practice, as a rule, is not inviting. It is attended with much hard and dirty work, long hours, and heavy expenses, while the remuneration is very inferior. Many farmers object to payments for journeys, and frequently are "long-winded" in their mode of discharging accounts, and there are few men in country practice at this time who can say their whole income amounts to £200 per annum, out of which he has to pay all expenses common to house and establishment. Can we wonder, then, th veterinary surgeons add to their professio grocers' shops, public houses, &c., and no and then execute a quiet bet, or do "a l of horse dealing," to "keep the pot-a-bo ing?" We feel still less surprised after lear ing these facts, when we are told that th are "competent so far as treatment of hors is concerned," because we know the practi among equine patients is far more clean more profitable, confers more honour, a hence, practitioners settle in large tow where they obtain what every intellectu man has a right to claim for his time a abilities—remuneration.

A word as to furnishing the requisite i formation at college. As far as we reme ber, students during their graduation seldc see any other than horses alive, as visiti cattle at the respective farms or cow-hous is neither permitted nor is it practicab Demonstrations, dissections, and lectur take up eight out of the twelve hours call day, and much useful work remains for e cution at home. The neighbourhood a large city or town is not likely to affo much cattle practice, and the upshot of t whole is, if the young man comes up fr the country, with his brains unencumber by details of practice among cattle, shee and swine, it is certain he obtains very lit more from the occasional lectures deliver on the subject.

Cattle pathology, or the doctrine of cat diseases, is a most comprehensive and valual subject, but it is the least noticeable feat in the curriculum of most of the veterina schools, being usually mixed up with t pathology of other animals, from which congruous mass the student has to rescue in accordance with his own judgment. Ar

t a few instances, those who have been l to the professorial chair were young who never saw as much even as six hs' practice, and have nothing to recom- l them beyond their attention to the ɔus duties of two whole sessions of five hs each, and an intervening summer of ess at home.

order to overcome the pitiable condi- thus brought about, it is proposed to ɔoint an efficient assistant to the Profes- ɔf Cattle Pathology, in order that he more satisfactorily attend to the appli- ns of members of the Society." There however, other means of meeting the ulty. It is well known that the Royal rinary College authorities opposed the ıpts to introduce into the charter of the ıl College of Veterinary Surgeons—the er a teaching school, the latter being the which confers the degree of M.R.C.V.S. apprenticeship clause, because, it was ted, that young men having served as l with a practitioner would prove a diffi- ɔerson to teach, as all must be remodelled, new ideas conferred. This may be in- eted as the possibility of his *knowing too* . For similar reasons also, we suppose, *actical examination* of the students ap- l for by the Royal College of Veterinary eons, to take place at the Camden Town ol during the present year, was refused.

the interest of veterinary science, narrow views are highly destructive, and nothing short of a liberal spirit and powerful energy will succeed in cultivating the tone required for the safety of our flocks and herds. A Professor of Cattle Pathology should have no other employment or office. It would be more profitable to give him the duties and salary of the assistant proposed, and enforce a regular observance of the first. Next, we would counsel the Royal Agricultural Society to promote the introduction of an apprenticeship clause in the charter referred to, and so demand *practical* as well as theoretical instruction among the *alumni* of the schools; and in the selection of men for the rural districts, the Society would do well to organize a scheme of contract service over a defined area, and guarantee to efficient men a regular and sufficient annual income. Nothing short of a well organized and comprehensive system will suffice—one by which the veterinary surgeon would become the confidential adviser of the agriculturists, and one by which their interests would be recognized as mutual and identical, instead of being opposite and opposed, as at the present time. Veterinary science, as affecting our live stock, is a high and noble calling, but the mere pursuit of it for love alone is not very profitable. As soon as the requisite provision is made for the reception and use of talent in the rural districts, as much as is required will be quickly furnished.

BOG SPAVIN.

WRITER in *Turf, Field, and Farm*, gives the following account and treat- t of bog spavin :—

ɔg spavin is an increase of synovia in ıpper or chief joint of the hock; it lies ı the most inward and forward portion ıat part, developing in front of the hock . It is a soft fluctuating swelling in- :d by the distention of the bursal cavity ıe joint, which is filled with the natural fluid of the joint, though changed in quantity and quality, caused by inflammation of the mucous pouches. By pressure they impede the flow of blood, which gives the vein the appearance of being the seat of the disease.

Bog spavin is produced by repeated shocks to the limb, and in this respect resembles wind galls; though situated in a different locality, it is also liable to the same changes. The affections are the same, and are dissimi-

lar only with regard to their relative situation. These shocks to the limbs are superinduced from a variety of causes, the first of which, in young horses, is from improper and over-rough handling in breaking the animal. If the colt is ambitious and spirited before he is broke, a great deal of unnecessary tyranny is used in subduing him, and by the time the task is accomplished, the poor animal, otherwise timid, kind and affectionate, is spavined, and too often left with his noble spirit broken. In older horses, bog spavin may be caused from overwork of any kind, such as drawing heavy loads over rough roads, hard driving, or riding long distances, and also from violent falls, a sudden fright causing the animal to throw the whole weight of his body upon one or other of his hind legs as he swerves from the path he is travelling, riding or driving him very fast and bringing him up all standing with a sudden tug at the reins, &c., all of which have a tendency to jar and strain the tendons, ligaments, and tissues of the hock joint, and a bog tumour is the result. Bog spavin, though not necessarily a cause of lameness, it is at times liable to assume an aggravated type, and is often accompanied with thorough-pin. In such cases, if the animal is kept at work, lameness will surely supervene.

Treatment.—Pressure is not advisable with bog spavin, though useful in thorough-pin, except when the spavin is pricked, when a bandage is temporarily applied to cause a discharge of the lymph. Begin the treatment by giving the horse rest, absolute rest, from all work. If the enlargement does not disappear, physic with a mild "condition" ball, and rub the affected part with the ointment of red iodide of mercury. If the enlargement returns, apply a blister compounded as follows:—Mercurial ointment, 3 ounces; powdered flies, 1 ounce; camphor (dissolved in a few drops of spirits), 5 drachms; olive oil, ½ ounce.

Let this be well rubbed in, and renewed at the end of the third week. After the blister is quite well, the spavin generally will have been removed. If traces of it remain, firing may be applied to ensure a cure.

WORMS IN HORSES.

INTESTINAL worms are parasites which develop themselves in all the domestic animals, each, however, possessing its own varieties. The presence of worms in the digestive tube is marked at first by an increased appetite, but the animal, notwithstanding the quantity of food which he consumes, falls off in condition; his coat is rough, and is not shed at the ordinary time; there is an annoying itching, which causes the horse to rub his upper lip against the manger or on the wall; sometimes there is considerable itching about the rectum, which is indicated by the horse's rubbing his tail or rump against anything within reach. The symptoms mentioned are such as would cause one to suspect the existence of worms, but it is only when these appear among the dung voided by the horse that we can speak with certainty on the nature of the disease. At a later period, and especially when the worms have developed in great numbers, the symptoms are very much aggravated, and the horse becomes emaciated and suffers occasionally from colicky pains, the flank is tucked up, the inside of the eyelids is pale, he walks with difficulty, and a fatal termination will sometimes ensue. A dose of aloes (4 or 6 drachms) may be given, which has often the effect of expelling worms without having recourse to further treatment. If this fails, divide 6 ounces of iron filings among twelve balls, and give one every morning until they are finished, and then give a dose of aloes, which will cause the expulsion of any worms which remain in the horse's intestines.

BOTS IN CATTLE.

[a recent meeting of the Builth Union, Mr J. Vaughan read an elaborate on grub in sheep, and bots in horses cattle. With reference to the insect iar to the latter, he remarked:—Besides ots peculiar to the horse and sheep, ı adhere by small hooks and live in the ıal mucous linings of the head and in- es, there are those of a distant kind be- ng to the same family which live in their state under the skin of the backs of , deer, and other animals. The larva of Estrus Bovis, or great ox bot, is unlike ırva of this genus. When young, it is th, white, transparent, afterwards be- s of a deep brown colour. On examin- he dots seen on the segments of the , real hooks, turned in different direc- , can be detected, which, when moved t in the abscess, increase the irritation, so increase the discharge of pus and r for the sustenance of the grub. In ummer months, usually about June, the , when of mature age, passes out gh the external opening in the skin, and ins in its crysalis state from about the end of June till about the middle of st, when the fly, forcing open a very sin- triangular lid, or operculum at the small makes its appearance. Its effects on the are often remarked; but the fly itself is rarely seen or taken. When depositing its egg, the pain it inflicts appears to be very severe. When one of the cattle is attacked by this fly, it is easily known by the extreme terror and agitation of the whole herd. The unfortunate object of the attack runs bellowing from amongst them to some distant part, or the nearest water. The tail, from the severity of the pain, is held, with a tremulous motion, straight from the body. The rest, from fear, generally follow to the water, or disperse to different parts of the field. In former times, when oxen were yoked to the plough, one of these flies would make them quite uncontrollable, and off they would run through hedges or whatever obstructed their way. Usually, the strongest and healthiest beasts are preferred by this fly; and I have been told that dealers consider bots in the back as a criterion of goodness rather than otherwise. The whole of this family of insects appear to have a strong dislike to moisture, since the animals find a secure refuge when they get into a pond or brook, where the other flies which annoy them follow without hesitation, but the Œstri rarely or never; and during very cold, rainy, or windy weather they are not to be seen. The fly has brownish unspotted wings, belly with a black band in the middle, and its extremity with orange yellow hairs.

The Dairy and Poultry-Yard.

MARKETING OF DAIRY PRODUCTS.

MR WILLARD, who is one of the greatest authorities about dairy produce in America, and who had an article on "American Butter Factories and Butter Manufacture" in the last number of the *Journal* of the Royal Agricultural Society of England, has been giving an address to the Chautuaqua dairymen, who have formed themselves into an association "for promoting the best interests of dairy farming, of cheese and butter manufacture, and the marketing of dairy products." Mr Willard said, we quote from *Moore's Rural*:—

"The knowledge and practice of a good system of dairy farming is essential to success. To know how to properly manufacture butter and cheese is also of great importance. But there is something beyond this which not unfrequently paralyzes our best efforts—a loose and unskilful manner of disposing of our products. No business is conducted properly when the expenditures are liable to exceed the receipts. At present the farmer is too far removed from the consumer to realize to himself the fair proportion of the legitimate profits of his produce. Too many middle men intervene between the farmer and the consumer.

Experience has demonstrated that associations and combinations of resources accomplish very much that is beyond the power of individual action. As yet, its application to the dairy interests has been altogether too limited. An organized system of marketing will be found to benefit both the producer and the produce dealer. The expenses of hunting up and gathering together scattered parcels of dairy products must be lost to the produce dealer or taken from the farmer. Suppose a farmer has a few tubs of butter and a few hundred lbs. of cheese. The dealer's agent in journeying to the farm will average an expense of say 10 dols., which must be met either by the dealer or the farmer. Neither can afford to lose it. A system that will save this waste of time and needless expense will thus be of mutual profit. Let the dairymen have a fixed time for meeting at a convenient location near a railroad depot, where agents can purchase by samples or by the load, and higher prices will be readily given, while a greater profit will be realized by the dealer, because running less risks from the change of market prices. The price of the commodity for sale, transmitted by telegraph, is known, and the sale is effected upon the current rates of the day and not those of a week old. Under the present system, the agent has to allow for prospective prices. He has the market rates of the previous week, but is not informed as to the *then* condition of the market. But if allowed to purchase at stated seasons, at stated places, with the certainty that his purchases can all be shipped the following day, with the actual condition of the market for the preceding day before him, he *reduces his risks*, and can afford the higher prices arising from competition. The heavy losses often occurring to the dealer under the present system, always re-act upon the farmers. In this new method we are not depriving the agents of legitimate profits, but are cutting off expenses that can be saved, and thus lighten the margin between the producer and the consumer. At a central market the competition of the producers ensures livelier efforts for the making of better butter and cheese. *Quality* is more of a test. Experts meet each other, and their combined judgment goes further, and is more satisfactory. The bridge between the manu-

r and the buyer is narrowed down, greater community of interests estab-

y county should have its central mar- The custom has long since been in in England, with the best of results. ls are provided for market purposes, a farmer wishes to buy or sell a pig, orse, or other agricultural commodity, s to the market, instead of hunting the country for buyers or sellers. s saved. Nothing strikes an American with more force than the fact that the ı farmer realizes a greater profit, gh forced to far heavier outlays for r taxes. The secret of the difference d in the market system. By reducing es and risks, the produce dealer pays oducer more money, receives of the ıer less, and still makes an equal if not profit than under the loose and unsatis- system so much in vogue with Ameri- mers.

teen years ago, a sales day was estab- at Little Falls. Innovations on long ished customs always work slowly, and s no exception. In 1864, I opened in *ica Herald*, the first regular reports of es of butter and cheese at Little Falls. have regularly continued in the *Rural Yorker*, and the Little Falls market has ed general attention. As a result, for t few years the great houses of Man- , Liverpool, and other European cities, the butter reports of Little Falls for ınd cheese rather than those of Boston w York. Prominent eastern and wes- ıpers, as the *New York* and *Chicago e*, also have the daily reports at Little But a better organization was needed, March last a State Board of Trade, s headquarters at Little Falls, was ed. Stands are to be provided for eral dealers, and all are to be pro- vith the latest information obtained ıe regular European and American ondence, and telegraphic reports

establishment of other boards like this ı have organized to-day, we hail with satisfaction, and heartily desire a mutual co-operation. At Little Falls, it is proposed to hold weekly discussions at market days, of an hour's duration, upon practical topics connected with the manufacture and sale of butter and cheese. The markets or sales are in the open street. Dairymen are present with their butter or cheese in their waggons. Some also sell by samples. The farmer takes a railway receipt of the weight, which is given to the dealer or his agent, and the money promptly paid, the articles to be forwarded on the day of sale, or on the following day. The sales are thus made cash transactions. To factory men and farm dairymen, especially, this system has become an absolute necessity.

We are living in an age of competitive industry. Branches of industry which cannot be profitably carried on in one section because of temperature, moisture, and climatic influences, in other sections thrive abundantly. Many sections of New York cannot compete with the west as a grain growing region, but the dairy thrives, while in other localities it cannot be successfully prosecuted. I believe the inducements for dairying in western and central New York to be second, in profit and utility, to no other branch of industry in the entire country. It is urged that there is likely to be an overproduction of dairy goods. This prediction was made twenty years ago, and the demand still remains altogether in advance of the supply. We are now producing 700,000,000 lb. of butter, and 250,000,000 lb. of cheese a-year. We have no butter to export, but send abroad annually about 60,000,000 lb. of cheese. The population of the United States is 40,000,000. Allow an ounce of cheese a-day or one-third of an ounce a-meal for each person, and it would require 910,000,000 lb. to supply the annual home demand — 600,000,000 lb. more than are now manufactured. But deduct 10,000,000 lb. for non-consumers, and allow ½ an ounce only a-day for the 30,000,000, and there are still 100,000,000 lb. of cheese to be supplied above the present quantity produced. The fact is, cheese is a cheap and

nutritious food, and it is for the interest of all parties to use it more largely for table consumption. The more its use is stimulated the better. We want cheeses weighing from 10 to 15 lb., instead of at 60 lb. In England, cheeses of this smaller size will readily net 20 cents a lb., where large cheeses sell slowly. We want a cheese everybody can buy without cutting. Thousands will purchase a cheese for 2 dols. when they will not buy for 10 dols., although at less cents per lb. He referred to the late invention of rectangular or oblong shapes for small cheeses and said they promised to be a success.

Concerning the manufacture of cheese, he said, I can refer especially but to one or two points. More care and attention are requisite *in the curing of cheese.* The temperature of about 70 deg. is the best for curing. An improvement is secured by locating the dairy buildings on a side hill and laying large tile pipes underground, and arranged so as to communicate with the dry house or milk room. A constant supply of fresh air passing through the pipes is cooled, and a low, even temperature maintained in hot weather at a moderate expense.

One of the best cheese seasons, that of 1869, was due to the coolness of the season. Last year, an immense amount of cheese was out of flavour, because of too much heat, and the failure of cheese producers to keep a low, even temperature in the curing rooms. The inventor of a system that will, no matter as to the weather, secure in our curing rooms an even temperature of 70 deg. to 75 deg., will be entitled to the gratitude of dairymen and the trade to the remotest periods of time. We know practically, that a uniform temperature of 70 deg. is best adapted to break down the caseine in curing cheese, so that it will be transformed and amalgamated with the other ingredients of the cheese into that mellow and rich taste which the markets now demand as the highest type of this nutritious article of food. It is because caseine can be turned into oil that cheese, not particularly rich in butter, when pro ripened, appears more rich and bu than its analysis indicates. In other w cheese made from milk that has been tially skimmed, may, if properly curec more mellow and palatable than cl made of whole milk when the curing pr has been imperfectly carried on. These are proved. Professor Caldwell, in a re lecture before the Utica Convention, plained how the coagulation of the mil cheese-making, as well as the ripening o cheese, is due to a species of fungi so mi as to be only recognized by the powe the microscope. Under certain condit they reproduce themselves in vast numl and when temperature and other things a vourable, these fungi subserve the very im ant purpose of breaking down the caseine, mellowing the cheese into a delicious m of food suitable to the wants of man; also that when temperature and other th were unfavourable, both the milk and ch were taken possession of by another cla fungi, injuring the product by its putrefac element. It is this latter class of infus that the cheese-maker has most to cont with and keep in abeyance.

In the making of high priced fancy che especial attention must be given to the ed tion of the senses of seeing, feeling, tast and smelling. The efficient penmen learns to accurately measure size and dist with the eye. The cheese-maker often w too much by rule. It is by especial trai of the eye and the faculties of feeling smell that a few excelled and produced fancy cheese. By carefulness and perse ance the quality of cheese could be gre improved, the consumption increased, the profits proportionately enlarged.

In conclusion, it was his firm convic that cheese-making can be made remuner for the present and the future. Chees fine flavour always brings fair prices. the poor stuff that fails. Furnish the g so as to promote sales for home consumpt and there will be no trouble.

BUTTER FACTORIES—THEIR ADVANTAGES.

MR E. N. FARRINGTON, Connecticut, who has recently given considerable attention to the subject of butter factories, supplies the following facts regarding them to our American contemporary, *Hearth and Home.*

The facts in regard to butter factories are simply as follows:—There are now from 1000 to 1200 butter and cheese factories in New York State, of which at least half make some butter, and several hundred make only butter and skim-milk cheese. The profits depend on:—1. The price received for the butter and cheese. 2. The kind of skilled labour employed, and the conveniencies for the business. 3. The amount of milk furnished to the factory, or, in other words, the proportion of the expenses to the receipts from the sale of butter.

1. The butter will always bring from 5 to 10 cents per lb. more than the average of dairy butter, on account of its uniformity, being made daily, and whole firkins packed at once. If the best butter-makers are employed, it will bring from 10 to 20 cents above average, and steadily hold its price. So much skimmed cheese is now made, that the price varies from 4 to 12 cents per lb., according to quality. Hence (2), A good cheese maker is necessary. For the butter should pay for the milk, and the cheese pay all expenses; but in this as well as all other things, skilled labour is costly, for a good workman is always in demand.

The factory will cost from 2000 to 4000 dols. The simplest way of finding a plan is to visit Orange or Cortland County, New York, and examine the factories there. The prices of the requisite machinery may be learned of Gardener B. Weeks, Syracuse, New York, Secretary of the American Dairymen's Association, who will send a price-list.

One vital necessity is a spring of cold water, sufficient to fill a 2-inch pipe at all seasons.

3. To meet the necessary expenses, the milk of at least 300 cows is needed. Otherwise, even with good prices, the dividends for milk will be too small to satisfy the producers.

	Dols.
For example, if 100,000 quarts of milk earn 4 cents a-quart	4000
Deduct expenses	1500
The producer receives 2¼ cents a-quart	2500
300,000 quarts at 4 cents a-quart	12,000
Expenses, say	2000
The producer receives 3⅓ cents a-quart	10,000

And for every additional 100 cows, the expense of one labourer is sufficient. In past years some factories have netted 4 cents a-quart to their patrons. Few probably did as well during the season of 1870. In a new section, the best mode of beginning is to organize a stock company, the capital being taken by the farmers who send the milk (the interest counting among the expenses). A committee of management is then appointed, who choose the superintendent, make sales, &c.

MILK PRODUCTION OF VARIOUS BREEDS.

A CORRESPONDENT of the *Country Gentlemen* says:—I observe a statement of Messrs Sturtevant Brothers, in your issue, making comparison between Dutch cattle and Ayrshires as milkers, shewing the profit to be in favour of the Ayrshires, basing the comparison upon respective weights of cattle. According to my experience, cattle consume food in proportion to their weight; there the comparison ceases between large and small cattle. Large cattle take less room in proportion, no more time or trouble to

feed, and much less time in proportion to milk, and are proverbially much quieter in disposition.

Now, as I know nothing about the Dutch cattle by experience, but considerable about Ayrshires and their grades, and also Jerseys and their grades, I would say that I have found both Ayrshires and Jerseys too high-tempered and irritable, and the shorthorns and grades the most docile of all, and though I found the Ayrshires the best milkers for weight, there was more profit in larger cattle; and if we can equal in this country a statement I heard Professor George H. Cook make in a public lecture in Elizabeth, a short time since, in relation to Dutch cattle, I think the Dutch will be the "coming cow." Professor Cook stated that on his visit to Holland last year, he visited a farmer near Rotterdam, who kept twenty-six cows, and raised milk to sell, and their average (for the whole dairy) was full 12 quarts per day, and that, subsequently, he saw other farmers there whose average was equal. This is a far larger yield than here. Colonel Waring makes a statement from a gentleman of Syracuse, New York, as follows:—

Average number of cows kept	18
,, product of milk per cow	5359 lb.
,, price per quart	4.99 cents.
,, time of cows in milk, 9 months, 3 weeks, 1 day.	
,, No. of cows in milk for the season	14⅔
,, ,, dry for the season	3⅓

His estimate of weight of milk is 2 lb. per quart, but I have weighed it frequently, and have never found it less than 2.2 lb. per quart, and if left standing until perfectly cool, have had it weigh as high as 223 lb. for 100 quart.

Allowing 2.2 lb. per quart, and we have an average of	6.7	quarts per day.
Messrs Sturtevant Brothers	9.6	,, ,,
Dutch, nearly	12.1	,, ,,

Annexed I send you a statement of my own dairy. I raise milk and sell to a milkman at 5¾ cents per quart the year round.

	1868.	1869.	1870.	1871.
Av. No. of cows kept		15.7	14½	13¼
Total amount of milk raised, quarts		44,852½	39,971½	36,919½
Av. number of days of cows in milk	313	295	297	322
Av. number of days of cows dry	52	70	68	43
Av. No. cows in milk		13	11.8	11.7
,, ,, dry		2.7	2.7	1.5
Av. No. of quarts per cow per day	7.41	7.85	7.54	7.65
Av. No. quarts per cow per day for season	8.65	9.72	9.27	8.67

Years ended April 19th of each respective year.

The correspondent has omitted to mention the breeds from which the foregoing results were obtained; but examining these results, we are inclined to think that the breeds kept were either shorthorns, or crosses with large cattle.

A NEW CHEESE FACTORY.

CO-OPERATION, which, in many branches of our industry has been adopted with considerable success, is slowly but surely making its way in agriculture. Taking example from our American cousins, we tried the co-operative system of cheese-making in Derbyshire, with success sufficient to justify a like attempt elsewhere. The following account of a visit to the newly organized Lichfield Factory, which appeared in the columns of the *Staffordshire Advertiser*, will be read with interest:—

A new cheese factory—the third, we believe in England—has recently been started at Darnford Mill, near Lichfield, having sixteen contributors, and receiving and manufacturing between 600 and 700 gallons of milk daily. The factory is formed out of what was formerly a flour mill, and is consequently well adapted for the new branch

lustry. The chairman of what may be
l the company, is Colonel Dyott, M.P.;
Vice-chairman, Mr G. A. May. Mr
les Ault, who was formerly connected
the Derby and Longford factories, is
nanager, and Mr Charles Coxon the
tary. The factory consists of a ground
, the first room on which contains the
ı power, the cheese presses and salting
and the further room, the milk vats.
two higher stories are the drying or
:e rooms. The dairy, as well as the
cistern, is below the level of these
s. The engine is of 2-horse power,
s used for pumping the water required
: factory, as also for churning the whey
:r; the boiler is of 4-horse power, and
:d for heating the water to the degree
red in the various processes. The
ıinery has been erected by Mr G. Dakin,
erby, contractor, who, we believe, also
ied that in the Derbyshire factories.
water supply is excellent, the well on
ıremises pumping 3000 gallons, without
perceptible decrease in its contents, and
is of great importance in the manufac-
the water is considerably colder than
pumped at the Derby factory. The
· is stored in a large tank on the roof
.e first room, the tank holding 3300
ıs.

order to describe the entire manufac-
we will conduct the reader from the
ıning of the process. We should intro-
our account by saying that the secre-
; office communicates by a pair of sliding
; with the road. Through these doors the
is delivered, being emptied into a can
ble of containing 60 gallons, and which
s on a weighing machine. 10 lb. are
ed to the gallon, and for the quantity
:red a voucher is given by the secretary
: sender, a duplicate being kept by the
:ary. At the bottom of the can, on the
ing machine, is a valve, which on being
. by means of a chain attached to it,
; the milk to flow into the vats, two in
er, in the next room. We estimate that
vats are capable of containing at least
allons each. The milk-vats, which are
really the most scientific portion of the whole process, are made of two cases of wood lined with tin, with an aperture between each case. It was just 6 o'clock when we were present, and the milk, which was being rapidly delivered, flowed into the vats, whilst a pipe of cold water connected with the aperture already described, was turned on and allowed to flow between the two cases forming the vats. The object of this arrangement is to surround the milk with cold water, and thus, during the night, to keep it perfectly cool. The temperature of the vat-room was about 60 deg., but the milk on delivery generally reaches 80 deg., but is reduced during the night by means of the water (which on our visit sent the thermometer quickly down to 50) to about 54 deg. We will now suppose the milk to have been delivered into vats—where it remains for the night, during which, however, a very important movement is going on. A small wheel, something like a water wheel, with cup-cogs, is fixed in the corner of the vat-room, and connected with it is a pipe conducting the overflow of cold water from the aperture between the vats on to the cogs, which, gradually filling up, makes about one revolution per minute, each revolution requiring three separate movements of the wheel. To this wheel is attached a contrivance connected with a wooden shaft, stretching across the room, and to which is fixed wooden "agitators," these moving in both of the vats. This movement, which is constant, is required in order to keep the cream from risiug. This process continues during the whole of the night, and the consequence is that the milk and cream are not in the least degree separated. Early next morning milk is again delivered and added to the previous night's supply already in the vats, and the cold water is drawn off and replaced by a jet of steam, which quickly causes the milk to rise to a mean temperature of 80. This is, of course, subject to variation, according to the state of the weather, and can easily be lowered by the introduction of a sufficient quantity of cold water into the aperture. The rennet is now added, and the milk allowed

to stand for an hour in order that the curd may attain its proper consistency. The curd is then broken by steel cutters of various sizes, is again heated to a requisite temperature, and allowed to stand until in a fit state to be separated from the whey, which is drawn off by means of a syphon into the dairy below. The next process is the transfer of the curd from the milk vats into the salting vat, which is wheeled to the ends of the former. These are lowered by taking supports from under their ends, which enables the manufacturer to remove the curd with the greatest ease. The curd is now salted, and is kept constantly on the move, whilst the whey still remaining in it is carried by means of a pipe into the whey cistern below. It should be observed that the heat of the curd causes it to assume a consistency and a freeness from the whey which it is impossible to produce by means generally in use. The curd is next measured out into the iron hoops, which, to the number of twenty, stand on the presses, and possessing a screw leverage. After standing for one hour, the curd, which by this time has assumed considerable solidity, is taken out of the hoops, a binding of white calico is wrapped round them, when they are again placed under the presses, and screwed down both night and morning. These cheese presses possess a leverage amounting to a pressure of 7 tons. The cheeses in course of manufacture were 16 inches in diameter, and from 4 to 5 inches thick, and are allowed to stand under the press for twenty hours previous to being transferred to the drying rooms. The two cheese rooms are above those used as the factory, and are each fitted with five tiers of shelves, capable of storing 505 cheeses. At the period of our visit, there were 350 cheeses on the shelves, the first having been made on the 26th April. The rooms are provided with steam pipes, regulating the temperature, the general height of which is from 65 to 75 deg., but this, of course, is varied according to the weather. The dairy is fitted with one butter and two large whey vats. The cream is skimmed from off the whey into tins which are placed in cold water; the butter, after being made, is placed in its vat ready to be made up, whilst the whey is again let off by means of a pipe into the cistern below, whence it is pumped as required, being sold as pig feed at ½d. per gallon. The demand has on several occasions exceeded the supply, and we also hear that the whey butter meets with a ready sale at 1s. 1d. per lb. at the neighbouring markets. The salt and rennet added to the curd are calculated at so much per gallon, and an exact account of the contents of each milk vat is kept by the manager in order to know the quantities required. In the secretary's office stand what are termed candle glasses for testing the quantity of cream in any particular delivery of milk; and a lectometre is found to be of considerable service for the purpose of ascertaining the purity of he milk. The factory has been producing uncoloured cheese of the Leicester type, a class which finds a ready sale in the London market, and the manager informed us that he was about to make for exhibition at the forth coming national show at Wolverhampton. The "making," of which we witnessed the commencement, was of 620 gallons, and produced 627 lb. of curd. The whole process is extremely simple, and the rapidity of the manufacture really surprising. The utenstils are kept scrupulously clean, and the process from beginning to end seems to combine economy both of time and money, whilst the spirit with which the movement has been taken up proves that the promoters are doing everything they can to ensure success. Of the sixteen supporters of the factory, fifteen are real proprietors of the concern, and we were informed that since starting, many applications to enter into the co-operation from farmers in the neighbourhood have been refused.

The Naturalist.

*TRANSFORMATION OF INSECTS.**

"ONCE upon a time," as the old story books usually began, there dwelt in a city north of the Tweed, an elderly gentleman who firmly believed in the transmigration of souls; so much, indeed, was his mind taken up with this doctrine, that on one occasion he walked solemnly up to a carter who was beating a horse, and giving the man sixpence, exclaimed, "Hit that horse hard, my man, hit him hard—I ken't him when he was an exciseman!" What the disciple of Pythagoras would have thought had he had an opportunity of reading the work now before me, I cannot say, but very likely he would have been confirmed in his belief, for the changes in insect life are indeed very wonderful.

I have no book at hand to guide me as to the laws of criticism, for I am aware that there are certain rules and regulations laid down by those who profess to shew poor unhappy authors the road to perfection, and lead the way, otherwise I would endeavour to do Dr Duncan the justice he deserves.

Very likely I should begin thus: "This is a work of great learning and research." I should then proceed to give a few extracts; every now and then, however, slipping in a word of either dissent or qualified approbation, and most certainly I would select a few passages of rather hidden meaning, and making some erudite remark thereon, do my best to convince the author that *I* at least understood that which was not obvious to the mental vision of the ordinary reader.

Or I might assume another style, that of a contemporaneous critic on Gray's "Elegy."

"This little poem," said he, "however humble its pretensions, is not without eloquence or merit." Ah, poor Wolfe had a different idea of that inimitable poem when going from the fleet to that shore where he was among the first to know that "the paths of glory lead but to the grave."

I abandon all such efforts to startle you readers with intellectual surprises, and with all due humility, cease to wield the pen of a critic.

I shall inaugurate a new method, a new system, one which will save a great deal of the midnight oil, which reviewers especially pretend to require, and very likely save publishers also another species of expenditure.

I shall leave this book to speak for itself, convinced, as I am, that in this case at least there is no occasion to "assume the rod, affect the god, and seem to shake the spheres."

Yet it may not be uninteresting to your readers to know that there is within their reach, in an agreeable and readable form, "An Adaptation for English Readers of M. Emile Blanchard's Metamorphoses, mœurs et instincts des insects, and a Compilation from the Works of Newport, Charles Darwin, Spencer Bute, Fritz Müller, Pockard, Lubbock, Stainton, and others." It is most useful in this respect, that it embodies the opinions and researches of so many eminent men respecting this most interesting subject. The difficulties attendant on the compilation of such a work must have been great, involving careful study of the works of so many, and in some cases somewhat abtruse writers, and a love of fairness, in while publishing the compiler's own views, avowing them to be such, even when antagonistic to those whose *dictum* is law in the scientific world.

There are many portions of this work of peculiar interest to the readers of this Magazine, and with their kind permission I will name a few, ere proceeding to make a few remarks on the Book, as a whole. Chapter 9 is devoted to the *Thysanoptera*, a name derived from two Greek words, signifying, respectively, fringes-a-wing.

"The very small black flies which are such a source of annoyance to travellers in the summer time, and which fly into our eyes and crawl over our faces during the prevalence of warm, windy weather, principally belong to a kind of insect which is characterized by having very remarkable wings when in the adult condition. These insects exist by myriads, and there are several species of them, and they are all exceedingly destructive to flowers, and espe[illegible]v

* By Louis Figuier. London: Cassell, Petter, & Galpin.

to the bloom of cereal plants. The little black insects are to be seen on almost every flower, and they devour the delicate cellular tissue of the petals. Thrips cerealium is very destructive when it occurs in multitudes upon the wheat, barley, and oats, for it interferes with the proper nutrition of grain by nibbling the protecting envelopes and the tissues which connect it to the stalk. All the members of the genus Thrips—and they alone constitute the order now under consideration — possess four very narrow membraneous wings, without any folds or net-work upon them, but furnished and decorated with beautiful fringes upon the edges."

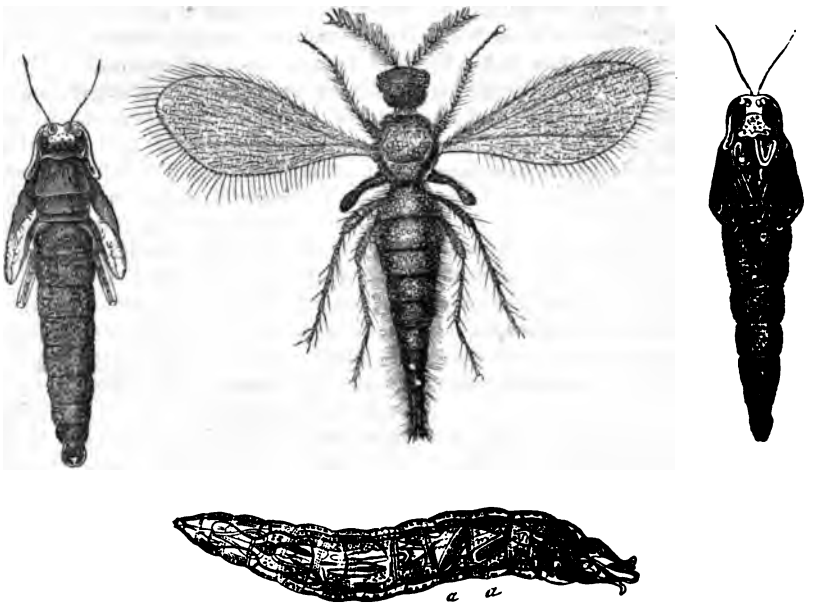
Very singular to say, the metamorphoses of the *Thysanoptera* have not received much attention, but are known to be of the incomplete kind.

Having in view the fact that this little gentleman is so destructive to wheat, barley, and oats, not to speak of earth's unhidden gems, her flowers, it might be advantageous to farmers and horticulturists to pursue this branch of study.

Chapter 13—on the *Diptera-flies*. This is of great interest to farmers. Page 394 begins thus :—"The *Cecidomyidæ* are very small *Diptera*, which, like the *Cynips*, produce gall on plants in which their larvæ live. Nevertheless, there are exceptions to this gall-making peculiarity, for the wheat fly, *Cecidomyia tritici*, lays its eggs in the centre of the flower of the wheat plant, and when its larvæ are hatched they eat the pollen, and thus prevent the formation of the corn."

An American species, which is known by the name of the Hessian fly, attacks the lower part of the stem of the wheat plant, and the larva nourishes itself with the sap, which it, appears to take by suction, and causes the stem to wither and die.

Our American friends seem to suffer considerably from insects, for in page 378 is an account of the damages inflicted by what is known as the Seventeen-years' Locust, who com-



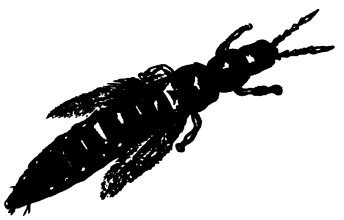
Cecidomyia, with viviparous larvæ.

menced paying its visits in 1715, as recorded in Philadelphia, and no causes have affected the regularity of its return at intervals of seventeen years, even to the very month. The song (?) of some of this species can be heard for the distance of a mile. "Oh, heavens! Oh, earth! bear witness to the sound, and pity the Yankee farmers."

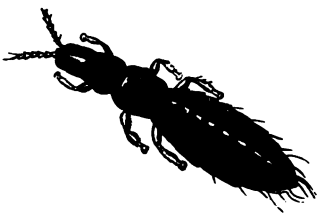
Without in the least degree alluding to gentle Juliet's question, "What's in a name," I cannot avoid making mention of the fact that the individual who gave the name of *Gentles* to the larvæ of the flesh and blue-bottle flies must have been somewhat puzzled for a reason for so

hen the following is given—"For they dead bodies." They are first called *ɔs*, and a single pair will eat up a carcase as a lion, for the reproductive powers of ale are enormous. This statement is allegorical, at any rate I object to the *ntle* as applicable to blue-bottles, gad-t-flies, either before or after that meta-ses so well described.

ɔf the most interesting chapters is the "The Crustacea." All ye lovers of lob-ɔiny lobsters, cray fish, prawns, shrimps, ɔider crabs, hermit crabs—I ask you to mind how that gaudy rover among the flowers was once but yon slimy caterpillar, browsing upon its favourite plant; let the youthful mind be enlarged by tracing in the plates illustrative of the wondrous changes of insect life, which even of themselves have power to fix on the eager, ardent, impressible mind, the truths they tell of, and the effect will be that the various conditions of all life will be accepted and believed in as proofs of the care of the Deity for the very meanest of His creatures. A remarkable expression in page 75, not only confirms this idea, but shews how the love of art may be cultivated,



The Adult Insect.



The Larva.

The incomplete metamorphosis of Thrips cerealium (magnified).

ɜ chapter—go and buy an aquarium, and ι common barnacle, a lobster, a prawn, b, which latter makes its first appear-life clothed—unlike the superior being later life devours it—in a tunic which, ', after swimming about with for a few s if proud of being born with a *shirt to its* hich, as you may remember, Sir Walter ɔld George IV. "was more than he could :asts it off as superfluous, and appears ıy, crabbed animal it is.

book is of great value to the young, and call attention to this peculiar feature in ks published by Messrs Cassells, which :ome under my attention. Take, for ɛ, the "butterfly." Every child loves to :, allured by the fairy-like beauty of its l wings; let it be impressed on the and good and lovely thoughts inculcated' Speaking of the brilliant colours of the butterfly. Dr Duncan says, "They are proofs of high art in Nature and the beauty of God's thoughts."

I am not acquainted with the Messrs Cassells, nor do they know who or what I am; and so your readers may believe that I do not unduly praise them for publishing, in so cheap and accessible a form, such valuable works on Natural History as have formed the subject of my Occasional Notes.

They will find their reward in the endurance of such books. The author who labours in his study to elevate and improve mankind deserves their gratitude; and the publishers, who enable all to have opportunity for reading the result of the author's labours, also deserve our approbation.

DUN-EDIN.

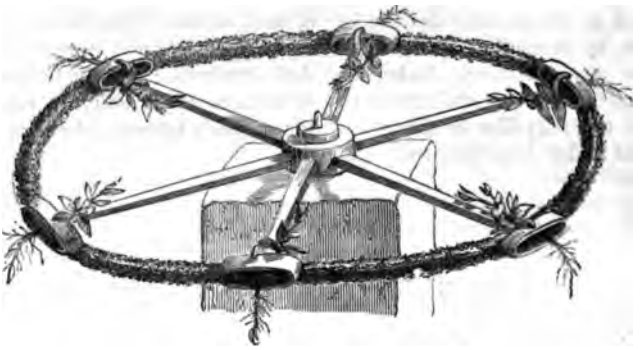
THE VEGETABLE WORLD.

ımerican writer very quaintly observed, hen alluding to self-made men, "No, my I go always—other things being equal—nan who inherits family traditions and ulative humanities of at least four or five ons. Above all things, as a child, he have tumbled about in a library. All men are afraid of books who have not handled them from infancy." Our trans-Atlantic cousin was right, and this idea seems to characterize the age as far as the books now published by some firms are concerned, for really any child "tumbling about in a library" must be a monstrosity if he or she does not grow up a true lover of books.

Just fancy a child growing up acquainted, if I may use the word, with such friends as the Messrs Cassell introduce him to! Can you imagine any one brought up in such society ever saying, "I hate books?" No! He would grow up to be that rarely-met with individual, a man possessed of scientific knowledge, and yet modest therewith; he would be like Solon, who humbly declared he learned something every day. The book now before me, "The Vegetable World," is a good illustration of the foregoing remarks. "Infancy," says the preface, "loves flowers, they are charming for the young, and in more advanced age we salute them for the remembrances they awaken, perhaps for graver reasons; for who can watch the annual return of the leaves, and flowers, and green herbage of spring, without wonder and astonishment, or contemplate their decay in autumn without some passing thought of his own future." And what would poetry be without flowers?

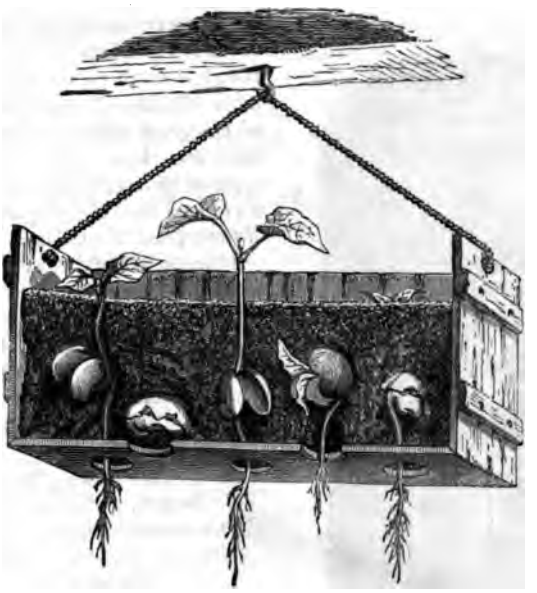
Suckers of the Dodder Plant.

Nature never wearies of them, in fact, she has her pockets full of seeds, and holes in all her pockets; so they scatter, the wind steals them, and away they go, filling the air as they pass with a floral Paternoster, and the *Amen* is always a flower. To come back to the book, however. I was particularly struck with the simple practical style of the very first sentence. Abandoning the old technical manner of description, the reader is quietly told to take a Harricot bean and



Knight's Wheel Turning Horizontally.

t it to the earth. Now, this is just the very youngster would like to do, and his reward made *so* easy," that a man forgets himself, forgets he is reading a serious work, and be-



Box Experiment.

lear understanding of what may be called ›ot of the matter. I am perfectly aware it is highly improper to introduce any- having the appearance of a joke, but the comes guilty of the offence second only to homicide—viz., verbicide? Very prettily is the root described, and I transcribe it. "The design of the Creator of the world seems to have been to embellish and make beautiful all which was to be exposed to our eyes, while that which was to be hidden, was left destitute of grace and beauty. Leaves suspended from their branches, balance themselves gracefully in the breathing air, the stems, branches, and flowers are the ornaments of the landscape, and satisfy the eye with their beauty, but the root is without colours or brilliancy, and is usually of a dull uniform brown, and performs, in obscurity, functions as important as those of stem, branches, leaves, and flowers. Yet how vast the difference between the verdant top of a tree, which rises gracefully and elegantly into middle air—not to speak of the flower it bears—and the coarse mass of its roots, divided into tortuous branches, without harmony, without symmetry, and forming a tangled, disordered heap.

Knight's Vertical Wheel Experiment.

These organs, so little favoured in their appearance, have, however, very important functions in the order of vegetable action.

A very useful moral lesson may be learned from that last sentence. "Destiny obscure" need not fear the disdainful smile of grandeur; and now, I suppose, you pardon the radical error of perpetrating a joke.

I have seen the famous Banyan tree, men-

s, Messrs Cassells are to blame: why they place on the title pages of all books published by them, "Science

tioned in page 13—the banks of the mighty Ganges have similar trees, of nearly equal interest, and have noted the strawberry on the

Tube Experiment.

banks of Lake Superior and on the Himmalayas; and more and more impressed have I been with what I believe the greatest writers allow, that all plants have a distinct, though varied (according to climatic causes) species. The elm tree is the same, in one sense, in America as in England, but it is of taller growth, like our American brethren, towering high in accordance with the lofty Republican notions among which it lives. No subject can be unimportant which has occupied the thoughts of so many sages; and the occupation seems to have been always delightful, for writers, many hundreds of years before the Christian era, evidently loved to dwell on the mysteries of "The Vegetable Kingdom," seeing in them, also, a feature of the great mystery of life. And from time to time men have sought, even from the daisies, types of beauty, evidences of Omnipotence, all of which, to the reflecting mind, lead to adoration of their great First Cause.

I have selected the preceding specimens of the woodcuts in this book. If I had my own way, I would extract them all, and, without one word as to the literary merits of this excellent volume, leave the subject. But I hold that the study of the Vegetable Kingdom teaches lessons all ought to learn. What does Ben Johnson say (oh, rare Ben Johnson!)?—

"It is not growing like a tree
In bulk, doth make men better be;
Or standing long an oak, three hundred year,
To fall a log at last, dry, bald, and sere.
A lily of a day
Is fairer far in May,
Although it fall and die that night,
It was the plant and flower of light.
In small proportions we just beauties see,
And in short measures life may perfect be."

Edmund Waller says truly—

"Small is the worth
Of beauty from the light retired."

But in another stanza the moral is pointed:—

"How small a part of time they share
That are so wondrous, sweet and fair!"

No home where young people are should be without this volume—its perusal must elevate, but as few will be content with one perusal, the elevation of thought will increase, as I trust the sale will, of this truly valuable and delightful book.

DUN-EDIN.

The Country Gentlewoman.

HORTICULTURAL ELEGANCIES FOR IN-DOOR DECORATION.

"GIVE me those flowers," as Shakspere makes Paris say to his page in "Romeo and Juliet." "Give me those flowers," as the pale, wan, bed-stricken patient, who looks longingly and sad as he or she beholds the fresh flowers of spring culled into a bouquet. "I want to look again at the face of creation." "Give me those flowers," says the fair petitioner, as, with an elastic bound and a merry laugh, she snatches them from the not unwilling hands of a friend of the sterner sex. "I do so delight in a posy to fill our vase. Its freshness, and sweetness, and beauty, are at times so captivating, it enables us to enjoy a little of the floral beauties of the country in our own house at home." "Give me those flowers," constitutes an aphorism, which is evidently inherent in all that worship at the shrine of Flora. The dwellers in the country were not contented with the plants and flowers indigenous to their soil. What was beautiful among them, was cared for and preserved; what was distasteful to the eye was passed aside. Foreign countries were explored, and whenever its flora was introduced, the cry has been, and is, and will be, "Give me those flowers!" The same principle has been enunciated by the dwellers in cities. They were pleased with a posy, with a bouquet of cut flowers, but their cup of pleasure was not full to the brim. More properly speaking, they had more than one cup to fill. Whenever it was proved that flowers were producible in cities, whenever plants of an ornamental character, be it for their variations in leaf, colour, or in their various conformations, the cry was silently expressed, "Give me those flowers." And now what a multitude we have to pick and choose from! The Pelargonium and the Fuchsia, and the Musk plant, constituted the chief of the races that city dwellers looked upon for beautiful companions, once upon a time; but now there is such a catalogue

Fig. 1.—Rustic Wood Basket.

that is beyond the reach of very many to follow up. Still the variety gives a selection to suit different tastes, and so all are more generally satisfied.

If, however, there were little choice in time past in the matter of flowers, there was also little disposition shewn to have objects of ornamental character to display them to most advantage. Great as have been our advances in the matter of selection of plants suitable for rooms, proportionately so has been the ingenuity displayed to provide a variety of plant receptacles suitable for the various places which plants occupy indoors. We have not only done so, but we have also provided them with means whereby artificial heat has been raised, thus having within our parlours and drawing-rooms a little snatch of the beauty of tropical vegetation. Many of our most beautiful foliaged plants, notably

the Crotons and Dracænas, which are perpetually beautiful when in health, must have a little artificial heat to tide them over our, to them, inhospitable winter. Yea, even the very Ferns indigenous to our clime, such as the Killarney, and the Oak, and the Beech Ferns, and the Welsh species, are all the better of a slight artificial heat during very severe weather.

But to return to the more immediate objects of our remarks at present: we appreciate plant life much more if we see it set in a good frame-work in our entrance halls, boudoirs, parlours, and withdrawing-rooms. If, for instance, we have our parlour window so filled up as to have a broad shelving for plant accommodation, instead of placing the plants in common earthenware pots, why not adopt the grouping system? There are a variety of vases and baskets in commerce, cheap to buy, and how very much more dress-looking, to use an indoor phrase, do they appear set in some or other of the forms to be had in the market? Take, for example, Barr & Sugden's designs, which are all neat, and quite the sort of receptacles for the purposes we name, and which by their kindness we are permitted to engrave, and you have a choice from the very cheap to the very dear. While they are elegant in outline, they are also designed upon the basis of *multum in parvo.* Mr Barr has had much experience, and shewn considerable aptitude for providing the sort of things that accord well with the other furnishing of the house. The Rustic Wood Basket, fig. 1, is not clumsy. It could be set in a position either in-doors or out-of-doors. It is, therefore, suitable for either town or country houses. When bulbs are in vogue, or in season, then this might be filled with a selection of Hyacinths, Tulips, or Crocuses, to suit the fancy of the fair attendants.

Fig. 2.—Circular Rustic Vase.

Fig. 3.—The Drawing-room Fern Case.

Fig. 4.—New Drawing-room Fern Case.

They might either be inserted in pots, and the pots afterwards huddled together, and packed round about and over with moss, or they might be planted at once in a compost of the usual kind placed in the zinc-lined basket. Then, when the season of bulb flowering is over, a collection of Ferns, as illustrated, might be introduced. A Palm in the centre, of such a hardy decorative character as Seaforthia elegans or Calamus asperrimus, would make an appropriate centre plant in a pot; and then there could be Ferns or Club Mosses, in variety, to form an agreeable shading of both, as to form, and colour, and contour. There is no end, indeed, to the change that could be made, and the pleasure propagated, with suitable plants in even a limited basket of this kind.

Fig. 2 is a rustic vase of circular outline.

It could be used for in-door decoration, as well as the one above commented upon, only it takes up considerable space. Ladies would prefer, as a rule, to have either of these in a good niche of some picturesque spot in the ornamental garden. There, indeed, they would be proper objects in keeping with the scenery. In an airy locality, however, where there is a recess large enough indoors, even this would not be improperly placed. The merits of these consist in their cheapness, and the space commandable for introducing a variety of plants, and changing them at different periods of the season. These, we understand, vary in price from half-a-guinea to a guinea.

The far more handsome stands for drawing-room decoration are represented in figs. 3 and 4. The Drawing-room Fern Case, fig. 3, is after the order we often see. Its principle is the same, but its details are more infinite, and it bears elegance on its very face. While it is so, appropriateness for the principal object is never lost sight of. This is wherein the merit of these horticultural elegancies consist. To give the Fern-case a withdrawing-room character, that is, to produce it in keeping with the many other elaborate and elegant traceries in cabinet wood, and in cabinets that often adorn a room of this name, an artistic stand in bronze rustic wood has been designed, and forms the pedestal whereon the Fern case rests. All cases of this kind are only suitable for the fine-leaved plants that now abound in horticulture. Flowering plants confined within the circle and limits of this little atmosphere, would not yield a single flower in perfection. Even the very buds would refuse to swell, and decomposition would take place before the florets were called upon in the natural process of plant life to expand. But for Ferns it is quite the little climate; and when one knows that both hardy and exotic species do beautifully, what a fund of pleasure it is to the ladies, and even to the gentlemen, who own them, to see plant life so fresh, and green, and eye-inviting.

Our designer, however, is not contented with presenting an attraction of this kind by itself for itself, for he furnishes a "*New* Drawing-room Fern and Plant Case," fig. 4, so admirably conceived, that doubtless many of our readers will be anxious to procure one, were it for nothing else than a drawing-room ornament. In this the buyer has all the accommodation for Fern culture under a bell glass, and pockets for choice plants arranged upon the pedestal. This is about the best thing we know of for artistic

Fig. 5.—Palissy Vase.

design; and if possessors had a greenhouse or pit to draw the riches of plant life from, it would be a source of inexhaustible beauty. As it is, many plants might be found to do well. Amaryllids, such as Hippeastrums or Vallota, would be very ornamental. Mostly all evergreen plants of the bulbous race would grow and flower, were they to have a good exposure to the sun for two months after flowering. Of course, there are the fail-me-never Pelargoniums, and Fuchsias, and Oleanders. If flowering plants are too expensive to keep up, then there are Palms and Ficuses, and Begonias, and Yuccas, and Agaves, all good plants for such a position.

Last among the elegancies, we notice at this time, is the Palissy Vase, fig. 5. This,

as can be seen from the engraving, is suitable for a variety of purposes. Chief among its uses is that for dispensing water in elegant arching spray. Nothing is more appropriate about a fernery than something of this kind. With a collection of gold and silver fish disporting themselves around its basin, it is quite entrancing. With a supply of water in connexion with the house, or villa, or mansion, and this vase placed in the conservatory adjacent, it could be made a pleasing piece of furniture in connexion with plants. It might be used as a Fern stand, or the centre piece in any dinner-table decoration. Any ornament which is convertible into a variety of uses, makes it additionally valuable

EDITORIAL NOTE.

IN the June issue of a periodical bearing the name of *The Free West*, and having for its avowed objects the dissemination of information to intending emigrants to the United States of America, there appeared an article entitled "Unjust Attack," and signed by Alexander A. Wise, the editor of *The Free West*, and its proprietor, we believe. Mr Wise had seen a critique on some articles written by our correspondent, "Dun-Edin," in our number for April, which critique appeared in the *New York World*, of the 4th of May.

It would seen that Mr Wise had not hitherto heard of us, and forthwith made inquiries from his news-agents, the result of which was the wonderful discovery that no such a serial as THE COUNTRY GENTLEMAN'S MAGAZINE was in existence, but that it was an advertising sheet emanating from the office of Mr W. H. Hayward, Commissioner for the State of Nebraska, United States of America!

We have no desire to have any misunderstanding with Mr Wise, or in fact to notice a person or a periodical capable of such gross mis-statements, the more so as that gentleman has been informed of his error, and no apology has been tendered to us! This is, of itself, sufficient evidence that the amenities, to say the least, of social life are not to be looked for from *The Free West*, its editor or proprietor, and we dismiss the subject in fond hope that *The Free West*, once a weekly newspaper, and yet sending in return for two stamps a number dated November 1870, when asked for in February 1871, may, now, that it has become a monthly, be as regular in its issue, contain news of equal importance to emigrants, and be as distinguished for veracity as the June number now before us.

THE

)UNTRY GENTLEMAN'S MAGAZINE

AUGUST 1871

THE OWNING AND OCCUPYING OF LAND IN IRELAND.

'HE Encumbered Estates Court has naturally culminated in that entitled Landed Estates Court, and the several ant-right Bills and Land Schemes, with y other panacea for agrarian grievances at unhappy country, have been absorbed the great Land Bill of 1869-70. Never-ss, the land question is still open in nd, and though we expected by this to be permitted calmly to consider the es of finishing stock in Ireland, and king the points in which they differ from customs of Great Britain, with a view nce to uniformity and reform, we are d again to contemplate the probable ts of mass meetings, and weigh the pros- of agriculture in the light of the "new tion for Home Rule." In immediate pro- t of the Show, however, we shall try to forget agitation exists, and shall, if possible, avour to regard, only in proportion to fects, and not according to the noise it s, Home Rule, that we may understand to estimate such evidence as may be coming, for or against progress, on the sion of the Show.

the facts already ascertained be ad-ble, then we expect that in every rtment of agriculture some improvement een made during the past year, except ix-growing and butter-making, in both nich, standing still is the order of the -which position must be considered alent to going back, inasmuch as in every other country, and in all other things in Ireland, progress is being made. But must we wait for *bona fide* "getting on" in farming in Ireland, as the hon. member for Meath would have us to do, till Home Rule is an accomplished fact? Or does the secret of progression in agriculture lie in farmers being ready—in numbers of 20,000—at a moment's notice, to look on, *silently, of course*, while evictions are being made, as the hon. member for Westmeath has been pleased to say is the right way? Or is the path of industry, as it is pursued in England, Scotland, the counties of Down, Antrim, Armagh, Tyrone, Derry, and almost all other parts of Ulster, as well as in every corner of Ireland more or less generally, the shortest road to prosperity and wealth, as far as the occupiers of lands are concerned? Or is it actually necessary that hereditary owners should be compelled to sell to those able and willing to purchase amongst the occupiers, in order that farming may be carried on—as it is desirable every other trade should—profitably?

If we were disposed to discuss the merits of these several theories as to the "royal road" to agricultural profits, if there be such a thing, we would venture to predict that no argument in favour of any course but that of industry, skill, and painstaking attention to every improvement in implements and modes of husbandry, would for a moment bear analysis, however cunningly constructed or

sophistically stated. Should a probability to the contrary be made apparent by general testimony, unanimously leading to a common conclusion, we shall be satisfied; but till such is the case, we shall continue to believe that in peaceful plodding industry, and not in the enactments of Parliament, lies the secret of success in farming. Is it to the effects of the special legislation of the past fifty years in favour of Irish agriculture, or to reformed modes of action, suggested often by agricultural societies, and constantly proved to be necessary by the comparisons of live stock and produce made at shows, that farmers are to attribute the actual and manifest progress of recent years? The evidence these shows affords us, which is in harmony with that which is to be had elsewhere, as the same subject establishes the fact that not to Government subsidies, so much as to greater outlay of capital by the farmer on his farm, has Ireland been pushed on in agricultural progress. We are actually inclined to have more faith in the economizing of natural fertilizers on each farm, than in low rents, or a landlord ready to suspend his rights in case of a wet season or light crops.

Beyond requiring security of tenure in some equitable, rational, and permanent form, we have no idea of the occupier hanging on the owner for support, but regarding bargain as between landlord and tenant the same for all mercantile purposes as if it between the pig-jobber, the butter-merc or the corn-broker, and the farmer. regarding the farming interests of Irelan much as those of the United Kingdom if Yorkshire or Argyllshire were in questi we think the owners of the soil have litt fear from agitation, however it may thre to take an agrarian shape; nor have occupiers anything to hope from agita whatever they may promise, whether the liament sits in College Green or the Rotu Owner and occupier have a common inte and ought to act together for the com end of taking out of the soil the gre possible amount of produce. Owners o to remember that it is not those who pro the highest rents that prove the best ten and occupiers ought not to overlook the that the lands at the lowest rent per acr not always the cheapest.

The agitator who keeps those who and those who occupy the land of Ire asunder, is the friend of neither; and agitation that disturbs the one in the sec of his investments, and keeps the other his work, that he may listen to fine spec is the enemy of both. But agricultural gress is too strong for Home Rule agitat and therefore we expect the Show to decided triumph in Ireland's staple ind —Farming.

LAND TENURE.

"IF any gentleman will shew me one tenant who has been robbed by being turned out of his farm unjustly, I will shew fifty or sixty who have never been robbed at all." This is the statement in a paper read by the Rev. C. Neville before the Nottinghamshire Farmers' Club. It has a decidedly Hibernian flavour about it. It is as good as that of the Irishman, accused of stealing a horse, maintaining that for one witness who would swear that he had seen him come out of the st with the animal, he could bring a hundre take oath they had never beheld him ir equivocal a position. Good landlords t are in plenty, no doubt, whose tenant far from having any right to complain ag them, have, in hard times, much reason t grateful; but it is not to be disputed there are many others who wring the shilling of rent out of their tenants, and

mpunction in dismissing them when
dvantageous terms are offered, the rise
frequently on account of the money
the occupier has expended, out of his
ocket, on permanent improvements.
assertion and counter-assertion of good
d landlords have, in our opinion, really
o do with the subject at all. The true
n at issue is this—Do present arrange-
as a rule, leave farmers at the mercy
ir employers, and is it right that this
f things should continue?
an of skill and capital takes a farm at
he considers to be a fair rent, having
to the state that the land is in; but
skilful, he at the same time observes
e outlay of some capital would ensure
h larger return from the soil than it
n previously yielding. He accordingly
cleans his land, and manures heavily.
r Earth, always kindly to those who
er well, gives forth an increased boun-
ess beyond all precedent on the same
tead. The agent, or factor, with his
observant eye, notices the full crops;
do others interested in agriculture.
nount of rent is inquired. So much—
1, 10s. or £2 per acre, as the case
e. "Ridiculous! I could easily give
£1 an acre more for it," exclaims an
s searcher after a bit of ground, who
t previously seen the wretched sub-
on which the occupier had to work,
ew little of the expense it took to pro-
he flourishing crops. The agent, of
is anxious to bring as much as he can
s employer's coffers, and in cases is
that the landlord may blame him for
ending sufficiently to the interests of
ate. So he informs the tenant—with
nce it perhaps may be admitted—that
he advances 10s. or £1 per acre, he
ave to quit the farm, as others are
who are willing to pay more than the
e asked upon the original rental.
an the tenant under such circum-
do? He must perforce advance the
noney on the land, whose good crops
outcome *of his own money*, or he must quit, and lose the benefit of his coin and labour together. Now this is what we maintain should be prevented by law, or by arbitration. There would be little difficulty in dealing with Mr Neville or Mr Barrow, or with good landlords, such as one of the speakers, Mr Helmsley, Shelton, described. We cannot, on general principles sympathize with the sensitiveness and sentiment of the farmer of Shelton. We cannot for the life of us see that there is any insult in asking that you should be insured by agreement from loss that you *might* sustain; nor degradation in signing a document offered to you in order that you could with certainty rely upon compensation for the expense to which you had been put, in order to grow good crops.

A landlord's life is no more secure than a tenant's. The best of landlords die as well as the worst. Nay, if we are to believe Wordsworth, the best die soonest.

> "Oh, sir, the good die first,
> But those whose hearts are dry as summer's dust,
> Burn to the socket."

Seeing, therefore, that there is no lease of life for landlords, the cultivator of the soil who desires to do good to himself and his country—the one predicates the other—should make sure by the lease of his farm for a period of years, or by a lease giving fair value for the money he has sunk in the ground, that he shall not be at the mercy of any new king arising who may be unacquainted with, or who does not care to recognize Joseph.

Mr Neville's remarks, upon which we have been commenting, were to the following effect:—The reverend gentleman said he did not attend there with the intention of giving them a lecture on the taking and holding of farms, but he came with the idea of raising a discussion. He would not rise to speak on the point, except in the expectation that it would elicit some observations from some other gentlemen besides himself, and especially from tenants, because the parties who were most deeply affected were the landlord who let the land and the tenant who took it.

His notion was, that both parties had to be considered. With that little preface he would move a formal resolution, which he had hastily drawn up:—"That a yearly tenancy, with six months' notice to quit on either side does not in all cases give sufficient security to the tenant for the investment of his capital in the due cultivation of his farm." This might be a matter of opinion; but, as a matter of fact, he certainly did know many cases where the tenant had cultivated his farm very highly, and had invested a good deal of capital, and from some, perhaps accidental circumstances, had received notice to quit at six months, and could not possibly get his capital out again. No man in his senses, who knew anything about farming, would disagree with him when he said it was impossible, if a man received notice to quit in October to go out in April, that he could get his capital out of his farm, for he must leave a great amount of artificial manure and other things in and on the land. He thought, therefore, that it was unjust to the tenant and injurious to the country; and he maintained that it would be a good thing if an arrangement could be made by lease, tenant-right agreement, or anything else, to render such an injustice an impossible occurrence.

JUSTICE TO LANDLORDS: THE IRISH LAND ACT.

He, as a landlord, did not approve of the views of the democratic party in London, though he was a great Liberal, for they spoke of landlords as trying to rob the tenants, and that sort of thing. This was all a heap of rubbish. The majority of landlords did nothing of the sort. He knew estates of 500,000 acres where the landlords were as honest and liberal as possible, and did not want to do anything wrong. If any gentleman would shew him one tenant who had been robbed by being turned out of his farm unjustly, he would shew fifty or sixty who had never been robbed at all. Of course, if a tenant had been robbed of £1000 or £1500, it was no consolation for him to be told that there were others who had not been robbed at all; but as a landlord, he declared he should be glad if some agreement could be hit upon to suit all parties, and to render it possible for the tenant to feel that, in any event, he would be fully compensated. The difficulties at first sight seem enormous, but when the Government were obliged to do it, they did it, for they granted a measure of great security to the Irish tenants. He did not approve of the whole of that Irish Bill, but he approved of the principle of it, and as an honest man he could not see why if the Irish tenantry were to be rendered secure from any casualty, the English tenantry should not have the same advantage. He had been all over Ireland three times, and knew a great deal about the country, but the only difference he found between the Irish and the English was this, that the Irish tenant farmed a great deal worse than the English; that the Irish tenant shot his landlord, while the English did not; and that the Englih tenant paid his rent a good deal better. These were the only differences he could see, and so far from sanctioning their going on year after year without trying to do anything, he thought that if landlords had honour and honesty about them, it was a reason why they should exert themselves more. The better their tenants behaved, the better they ought to try to behave to them in return, and for his own part he was very willing to bring forward the subject on which he had made a motion. He had hoped it might receive some consideration at Worksop, and he was glad to find Mr Foljambe, who was a larger landowner than himself, express his willingness to enter into any discussion of the sort, so as to grant the tenant greater security. He thought he had now satisfied them, or any reasonable person, that the object was a good one, and he would therefore go on to consider what would be done towards giving the tenant the security necessary.

LONG LEASES DISADVANTAGEOUS: CROPPING.

The Scotch plan was that of a lease of say twenty-one years, but this involved some other conditions. He found the Scotch

; full of advertisements of farms to let
venty-one years, upon offer, and it
d to him like a sort of auction. He
a great many tenant-farmers whom this
;ement would not suit, because they
rather go on under a large landlord
fter year, than have their farms adver-
in the papers, and have to bid for them
ction, as it were, for twenty-one years,
ey could often go on under a landlord
nuch longer period. There was another
:ion that was felt against leases. If a
t held a farm from year to year, he might
to get a better under a larger landlord;
on his (Mr Neville's) own estate, for
ice, if a farm of 200 or 300 acres was
:d, and a tenant who had hitherto held
50 or 100 acres was able to take it,
ways let it to him in preference to a
;er, and so on. It was a sort of pro-
n. Men of enterprise and capital
l not like to tie themselves for twenty-
ears to a farm of 100 acres or so, be-
they were hoping to get larger and
farms. Another disadvantage of a
was, that it necessarily involved some
nent as to cropping. An able land-
would say to a landowner, if you
/ith your land for twenty-one years, you
to have a strict agreement as to crop-
to provide for the due cultivation of the
He had heard that this had been ad-
l by tenants to be just and reasonable;
ill, his tenants being from year to year,
d no occasion to do this. He let them
as they pleased, with one con-
, namely, that they do not injure
:state. If they did not injure him
family, the more money they got the
for him. In this matter a good agent
f great use, but he should only act as
partial mediator between landlord and
, doing equal justice to both. He told
ent, Mr Bartholomew, at the last rent
'I think you are a good agent, for if
ing you rather go against me, and that
)od fault." If a tenant was not injur-
; farm, it was a great advantage to him
able to crop as he pleased, and he had
heard how it could be arranged under
a twenty-one years' lease. He granted a lease
was absolute security, but there were those
disadvantages, and he had set them forth for
their consideration.

TENANT-RIGHT—SECURITY TO THE FARMER.

To pass on to the question of tenant-right,
they had carried this so far in Ireland, that
now, when a man took a farm he must have
two capitals, one to buy the tenant-right and
another to stock his farm. It was con-
sequently no uncommon thing for a man to
exhaust all his capital in buying the tenant-
right, and then have none to put stock upon
the farm. He considered it was quite right
for a tenant to be compensated; but several
gentlemen had put the matter in this way:
suppose a farmer had two or three sons, and
placed them upon farms, and the tenant-
right on one was £6 or £7 an acre,
and on another £8 or £10, he had great
difficulty in fixing his sons. Therefore, in
the management of his estate, he endeavoured
to keep the tenant-right as low as he possibly
could; and in order to do this, he had
adopted a principle which he had not the
smallest doubt whatever would be the best
for both landlord and tenant, and it was this,
that he always advised a tenant not to invest
a single farthing in the permanent improve-
ment of his farm. He ought not to say that
he did not allow it; but he told his tenants,
ever since he came to the property, twenty-
five years ago, never to spend a farthing on
building, draining, or any really permanent
improvement. If they wanted any
building or draining done, he did it himself
at his own expense, and told them they must
pay him interest by way of rent at the rate of
five per cent. on the outlay. The tenant thus
kept his capital to work his farm with instead
of burying it in his landlord's estate, and
when he quitted his farm he was able to put
his money in his pocket. He had proposed to
Mr Gladstone, some six months before that
gentleman introduced his Irish Bill, that a Court
of Equity should be established for the adjust-
ment of these matters, as things seemed to
be in such confusion in Ireland. He sug-
gested that whenever a landlord gave a ten-

ant notice to quit, he should have the power of calling in a Court of Equity, or an arbitrator, or some one to judge whether he really had a claim or not. It was a thing which he, as a landowner, would be quite willing to do himself if the tenantry desired it. A running lease of three and a-half or four years had also been suggested, so that when a tenant received notice to quit, he should have the opportunity of having a course of cropping before leaving, and should thus be able to get back what he had spent on the land. The objection, however, which would strike everybody to this arrangement was, that if a tenant was farming badly, the landlord would be injured by giving so long a notice; and then, again, if a tenant had a chance of getting a better farm, he would be three or four years before he could leave, and might thus lose it. Some arrangement might, perhaps, be made for a landlord to give his tenant six months' notice to quit, and then to keep his farm on six months longer, and the tenant to be able to quit in six months—an arbitrator to be called in to give a just award to either party.

A Court of Equity would obviate the cost of a trial at the assizes if the matter should ever be pressed so far as that, but if the landlord was willing to have an arbitration, and they could not agree as to who should be the man, he would leave the selection to the chairman of the Council of the Chamber of Agriculture in the county. He did not want Acts of Parliament, his plan was entirely voluntary, but if some amicable arrangement could be made to grant the tenant greater security, he was perfectly confident that in the long run it would be for the interest of both parties.

GARDENING AND FARMING.

By Mr J. J. Mechi.

I COULD never understand why there should be any difference between the two as regards draining, deep cultivation, and abundance of manure and produce. I have asked why there should be any difference, and I am told by farmers:—1. That it would not pay to treat the garden as they do the farm—they would not grow enough. 2. When I say that is the strongest argument for gardening the land, I am told by the same parties that they have neither manure nor capital enough; they don't mean acreable capital enough, but, in plain English, they admit that they hold too much land in proportion to their capital. Now, there is nothing so easy as to double a farmer's acreable capital. I often say to my farming friends who have 600 acres of land, and complain of want of capital, "Take a farm of only 300 acres, and you will at once double your acreable capital, and from my practical experience I can assure you that you will thus considerably increase your percentage of profit." That question of increased acreable farm capital is one of the questions of the day, undergoing revision and solution, and the time is fast approaching when the important question will be, not how many acres do you farm, but how much is your acreable capital. I am daily more and more convinced that from £16 to £30 per acre is not too much on arable farms. I know several who have that amount, and thus make farming pay more than the common rate of profit. A cottage gardener who fattens his one hog on 20 rods of ground, absolutely makes at the rate of 640 lb. of meat per acre, or eight times as much as an ordinary farmer, therefore he also thus makes eight times as much manure. The result must be obvious. Therefore the quantity of meat a farmer makes on his farm, especially with food not the production of his own land, is a measure of his crop-producing powers. Britain is not half farmed, nor will it be until the acreable capital of landowner and tenant is increased.

THE EDUCATION OF AGRICULTURAL PUPILS.

R George Fanshaive of Charlton Manor, Foulsham, Norfolk, has ı a very sensible letter to *Bell's Weekly ıger*, headed " A Few Thoughts on aining of Agricultural Pupils." At the the writer shews that few professions or are more erroneously estimated in pubnion than that of agriculture. To many sents a most pleasant picture of sweet y walks and rides, the possession of s domestic animals, and the simple ıtion of the soil with modern agricultuplements, which, in their opinion, make ısiness of the farmer a mere sinecure.

for instance, a youth of sixteen eventeen years about to leave , who, in consequence of sundry nt recollections of a fortnight which ent at a farm a short time before, ınces, on being asked, in favour of g as an occupation. His ideas of a 's life are something of the following —that he never rises before breakfast ınless he feels inclined, which is only rious summer mornings, when the pearly angs on the grass, and a stroll before ast seems particularly inviting. He ıes that the thought of work never es him. Has he not plenty of men o all the manual labour on the farm, veral teams of horses to do the heavier ıf work?

youth adheres to his opinion, and his ı, yielding to his wishes, find a situar him with one Mr Broadacres, whose tion as a farmer is very good, but who wn by his more intimate friends as a little quick-tempered. The writer him for twelve months, at the end of time he asks him what he thinks the profession he has chosen.

w his tune is changed! Very little is ow about field sports, still less about lled happiness. And Mr Broadacres, e tells you that he knew from the first that his pupil would never make a farmer. He expresses unbounded confidence in his own knowledge, you are told he is forgetful, and dislikes working with his own hands. Three years afterwards, when the pupil has become a young man of twenty-one, you ask whether his experience has not increased since you last saw him, and he admits it; but also tells you that just in proportion as his experience increases, so does his responsibility, and that the management, work, &c., which, apparently satisfied his master at that time (since it elicited no grumbling or abuse), is far from doing so now; and that, try as he will, he seems never able to give him satisfaction, let alone please him. You ask him whether he has not a good deal of time on his hands to improve his mind by keeping up his old studies; and he tells you that the greater part of his evenings are spent in making out his accounts, and, worst of all, in casting up his land-measuring. "Land-measuring!" you say. "Does not the bailiff do that?" "Oh! no," he replies; "Giles used to do it, I believe, but Mr B. said that was the duty of every pupil; and Giles, who was very slow at figures, was only too glad to hand it over to me." Of course you cannot help feeling for your young friend, and agreeing with him that he does not complain without a reason; but you also wish to see Mr B., and inquire what he thinks of his pupil after four years' tuition.

He seems to think but little better of him than when you last saw him; he admits, perhaps, that he is less forgetful than he used to be, and that he may be a little more up to the mark in planning out men or horses for a day's work; but that as to making a farmer, bah! He knew from the first he never would. "Why, he depends upon me entirely to originate all the work, and even then he does not always carry out my plan. Ah, well, when I had had half his experience I managed a whole farm for my employer without

any assistance from him. And the idea of him farming a field!"

Your steps are now turned to the house of a Mr Claysoil, who lives some distance off, as you lately heard that he had taken an agricultural pupil, and you wish to hear his opinion of this much abused class of young men. He, after hearing your question as to what his own personal experience had been on the subject, almosts gets angry as he recounts a tale of misdemeanours and shortcomings.

"Though of good family," Mr Claysoil tells you, "and well supplied with money, his associates were chosen from the lowest classes. His evenings were spent at the village ale-house, from which he did not return till late in the evening, frequently the worse for drink, and in such a condition, of course, was utterly unable to make a single entry in his account books, besides being entirely incapable of rising early the next morning. I have almost made up my mind that this shall be my last farming pupil; and really I must be greatly in need of money if I ever take another, even on higher terms. I sincerely hope there are very few young farmers like him in the country, or else our profession would soon go to the bad."

Mr Fanshaive proceeds:—And now, as we have taken a little look at two kinds of young farmers, may I be allowed to address a few words of exhortation to those who are teaching their sons, or perhaps pupils the art of farming. Pray, remember that you were once as ignorant as that youth who has just come to you for instruction; that the whole thing seemed as strange and curious to you as it does to him; and that your father, master, or instructor, had to bear with a great deal of seeming stupidity in you; and though you may never have had such an unreasonable instructor as old Broadacres, yet that his impatience often surprised and annoyed you. Do not ever be afraid of letting him have an occasional holiday, or half-day, to enjoy himself. Then, how sad it is to hear some farmers abuse their pupils, in most severe terms, for the most trifling neglects or mistakes. One would think that at least a large sum of money must have been lost through their instrumentality, when it is nothing, perhaps, but the most frivolous fault, which can be corrected with no trouble at all. And now I may, by way of finish, say a few words of caution and advice to the very young man in whose defence I have been writing. Never give way to any degree of laziness; strive always to be at your post punctually in the morning; by so doing, you will gain the respect of your men, and the goodwill of your instructor. Be very careful to thoroughly understand his orders when receiving them, and do not mind asking him to repeat them to you, even though it may lead to a hasty word or two, and when giving these orders to the men, always be sure that they comprehend them well; for I have always found that if labourers can misunderstand your orders they will.

PRESERVING FOOD IN PARIS.

WE copy the following interesting article from *Engineering*:—

The Appert process, which for a long time past has supplied the marine with salt provisions that will keep for several years, was extensively used. Better still were the ready prepared viands of Messrs Ozouf & Couder, the excellent quality of which was universally acknowledged. However, for so large a population, the authorities preferred preserving the meat raw, so that each consumer might cook it according to his fancy. The preparation of cooked meat was left to private enterprise, and these preserved meats were welcomed by the people in spite of their high price, indeed, it is with a feeling of grateful

nbrance, not unmixed with solemnity, re recal the opening of the tin boxes ining beef *a la mode* or roasted sirloin ıose days when friends unexpectedly ed in, or the rations of horse meat, far nall, were eked out with those occasional es. To preserve the raw meat three sses were employed. The first was y salting, such as is employed in sea-towns for the use of the marine. M. illet organized special works near the hter-houses of Grenelle, for the applica-ıf the salting process. Meat thus treated ast long unchanged, but before cooking st be thoroughly soaked, and even then ınot be considered as very nourishing. process of Mr Wilson, an Irish inventor, sted in salting the meat to a smaller :e, sufficiently, however, to preserve it considerable time, and it formed a satis-ry mean between the fresh and salt pro-ıs. Other works were established in the ıbourhood of the slaughter-house of La tte, the staff of which was brought from nd. The animals were allowed to rest time before being slaughtered, and they had been killed the greatest care aken to prevent any germ of decompo-ı being deposited upon them.

ıe meat was first dried by a moderate ıg, and salt was also placed in incisions, ı were made in the thickest parts; it hen placed in the curing house, where :emperature was maintained below 10 centigrade by means of ice. These two :s of salting were applied to the best of attle and the horses, but they were not l suitable for mutton, which adds to the . large quantity of liquid, and completely oys the meat. For preserving mutton, process of M. Gorges was employed, ı consists in submitting the meat, after ; been cut in pieces, to a bath diluted chloric acid, and then to a second bath ining sulphate of soda. The meat is :d in tin boxes, sprinkled with sulphate da, the boxes are then soldered down. the sulphuric acid, generated by the re of the acid and the sulphate of soda, preserves the meat. To remove all disagreeable flavours generated by this process, it was absolutely necessary, before cooking, to soak it for half an hour in luke warm water, and afterwards to expose it to the air for one or two days.

The slaughtered animals supplied many valuable products in addition to their flesh, which it was necessary to turn to account. In the first rank, were the bones, of which the greater part are generally sold for utilization in different branches of industry. When bones are exposed to the action of chlorohydric acid they lose their calcareous element, and there remains only a soft elastic substance, the primitive form of bone, that is to say, gelatine. It was a long subject of discussion whether this substance afforded nourishment or not. Some, relying on the fact that it contained 50 per cent. of oxygen, maintained that it would supply the place of meat, while others contended that all alimentary value was lost, and brought forward, as example, instances of animals which died of inanition, yet had been allowed unlimited quantities of gelatine.

The general opinion was that this substance was available for food, but that it did not contain sufficient nourishment, when used alone, to support life, but it was necessary to utilize to the utmost the enormous quantity of bones and cartilage furnished by the animals slaughtered by the siege.

The Ministry invited special attention to this question, and four manufactories were put in operation to form the bones into gelatine, and to furnish the soup obtained from them for distribution to the poor at the municipal canteens. The bones were steeped in chlorohydric acid, to which four or five times the quantity of water had been added. The lighter bones lost their calcareous properties in two or three days; the larger and thicker ones required steeping eight or ten days; after being drained and washed, the bones were placed in a weak solution of soda, then washed freely with water, the sulphuric acid preserving them from decomposition. It was unnecessary to dry the softened results.

MM. Badois and Duchesne, struck with

the difficulty of regularly rationing a sufficient quantity of the soup at first made with this material to meet the demands of the people, proposed to manufacture a jelly, which, dissolved in hot water, would produce immediately, with a saving of time and material, a broth containing the properties of animal and vegetable food. They called it bouillon solide. Instead of removing the calcareous portions of the bone by chlorohydric acid, they extracted the animal matter from the bone by means of a digester—a process already used by Papin, and brought to perfection by Darcet. The bony tissue was submitted to the action of steam at a little above atmospheric pressure, to remove, in the first place, the fat with which it is impregnated, and then the gelatinous portions, which are afterwards condensed. This operation could be carried on more rapidly, and the product was purer and less highly coloured, if instead of steam, hot water was employed, under the necessary pressure. The temperature was raised from 106 deg. to 125 deg., or even 130 deg. centigrade, corresponding to 2½ and 3 atmospheric pressures.

The apparatus employed consisted in a cylindrical digester, 23 inches diameter, and 39 inches high, revolving horizontally upon trunnions; through one trunnion the steam was brought to the lower part of the apparatus; by the other trunnion water was introduced, which flowed into the upper part of the machine. The bones, properly washed, were placed in the cylinder; the steam first melts the fat which flows from the lower cock; water is then introduced, and in a very short time the dissolved gelatine is withdrawn from the same cock; it is concentrated in a steam boiler, and mixed with an infusion of celery, or other highly flavoured vegetables. Exposed to the air it solidifies, and in that form is available for canteens or for general sale. Thirty grammes of this concentrated essence dissolved in a pint of hot water, made a soup sold for 2½d. at the canteens. The importance of this manufacture of solid soup may be seen, from the fact that during the siege of Paris 6600 lb. were daily produced, which afforded 200,000 rations of half a pint each. After the Liebig extract was consumed, boxes of the solid soup were much in request, and became an important article of trade; if its flavour and nourishing properties were not of the highest order, it was of immense service to the Parisians, deprived as they were, in a great measure, of animal food during the latter part of the investment.

After having utilized the bones, there remained the fat. The horse presents in the various parts of its tissue and bones several varieties of fat—some liquid, like olive oil, others resembling butter in consistency, and all free from any disagreeable odour. These substances were used for culinary purposes, when the oil and butter were exhausted. The extraction of the fatty matter was conducted as follows:—The adipose tissues separated from the laminæ, were bruised between the fluted rollers of a crushing mill, which tore the cells in a temperature of 100 deg. centigrade, when the fluid fat exuded, the contraction of the tissues aiding the expulsion of the grease. The marrow was either extracted from the bones, or they were crushed and thrown into warm water, and the fat afterwards collected; no further process being required to render it fit for use. The bones of sheep and oxen also yielded fat, but it retained a slight odour.

A skilful and active manufacturer, M. Dordron, partly succeeded in removing this flavour, by steeping the fat in a warm infusion of alkali. This preparation was sold during the siege under the name of "Parisian butter," which was much improved by mixing it with horse fat.

Another experiment to produce a substance for supplying the place of butter was tried, by mixing suet and colza oil. The disagreeable taste and odour of these materials were partly removed by exposing them to the action of a fine water spray. The vapour which arose carried off in a measure the volatile acid causing the nauseous odour. The Parisians use pigs' blood in the manufacture of black puddings, but the blood of oxen was, previous to the siege, only employed in refining sugar; thanks, however, to the exertions of M. Riche, the blood of both oxen

and horses was turned to account, and the result formed a welcome addition to the scanty fare of the besieged. Sheep's blood does not coagulate, and could not be applied to the same purpose, but mixed with rice and fat, it was baked in earthen pans.

The offal, heads, feet, tendons, and entrails, were eaten, but as that is a question wholly pertaining to the kitchen rather than to any them trial inquiry, we leave the cooking of indusand its results to our readers' imagination.

AUSTRALIAN MINCED MEAT.

DR TAYLOR has reported to the Food Committee of the Society of Arts his experience of a sample of Australian minced meat. At the present time, when everything in the shape of animal food is so dear, all that relates to the chances of making it cheaper must be of interest to the producer as well as to the consumer of meat in this country. Dr Taylor thus writes of a sample of which he made examination:—

The sample had a brownish colour, and a smell of dried meat. There was no appearance of the red colouring matter of blood, and no trace of this red colouring matter could be detected in it by the most delicate chemical tests. Under the microscope, the meat had the characters of the dried fibrine of flesh, reduced to shreds, and intermixed with fibrous tissue. No acari could be discovered in it, nor any vegetable or mineral matter. It had a slightly acid reaction to test-paper, but there was no smell or taste to indicate that it had undergone decomposition. It had the appearance of meat deprived of the red colouring matter of blood, and thoroughly dessicated, either by exposure to heat (a low temperature), or some desiccating process.

In the dry state, the meat was tasteless. When soaked for two hours in water, according to the directions for use, it became soft, but it was not so completely softened as to render it palatable for food. Even a soaking of from six to ten hours did not give to it the property assigned to it in the directions, *i.e.*, the original condition of freshly minced meat. In this softened state, it was tasteless, and had the odour of dried meat. The addition of salt, under these circumstances, would give only the usual saline taste. With respect to cooking, it is difficult to understand how this would bring out a taste, or restore that which the meat originally had. A hot decoction was then made, but this failed to bring out any flavour like that of fresh minced meat.

The cold infusion and the hot decoction had a slight acid reaction. There is nothing unusual in this. There was no odour of ammonia, or of the offensive gases evolved in the decomposition of animal matter. Evidently the dessicating process had most thoroughly preserved the minced meat from chemical changes. Moistened with water, it underwent the usual putrefactive changes after four or five days. The meat macerated in cold water putrefied more readily than that which was macerated in hot water. Acetic acid formed with the softened minced-meat a jelly, just as it does with softened fibrin of muscle.

The cold aqueous infusion contained albumen, some soluble phosphate, and alkaline chloride in traces. The decoction obtained with boiling water contained gelatine, with alkaline phosphate and chloride in traces. There was no sulphuric acid or alkaline sulphate present. The dried minced-meat contained 10.6 per cent. of water, and yielded by incineration 3.4 per cent. of a perfectly white ash, in which were found phosphate of lime, alkaline, chloride, and sulphate, with

small quantities of potash and soda, and oxide of iron—the usual mineral ingredients of flesh. The dried minced-meat contained merely traces of oily matter, or fat. The fat had been carefully removed. When submitted to heat, it yielded nitrogen and sulphur in large quantity, the elements which are always found in good animal food.

The minced meat, in a chemical point of view, may be described as thus constituted in 100 parts :—

	Composition
Water (including matters volatile at 212 deg.)	10.6
Mineral matter or ash (chiefly phosphates and chlorides of potassium and sodium)	3.4
Gelatine and substances soluble in boiling water	8.8
Fibrine and fibrous tissue, with albumen and albuminous tissue, cellular membrane	77.2
	100.0

Conclusion.—This sample of minced meat contains all the usual constituents of dried, uncooked flesh, excepting the colouring matter of the blood. It contains 86 per cent. of dried fibrine, albumen, and gelatine, the greater part of which is fibrine. It contains from 60 to 65 per cent. less water than is usually found in fresh meat (beef). There is no appreciable amount of fat or oily matter. It contains, within a small bulk, all the usual constituents of nutritious animal food, and no mineral or other ingredients to affect its qualities as food. The objection to it is, that the process of preservation deprives it of that agreeable flavour of meat which stimulates appetite and creates a desire for food, no doubt owing to volatile matters lost in the dessication process, which no art can restore. Salt would give a saline taste, but unless at the same time some such article as the Ramornie or Liebig's meat extract is used for flavouring, it would be mawkish and repulsive as food. I do not doubt that it is highly nutritious and capable of supplying the waste of tissue, like other kinds of nitrogenous animal food. It cannot be regarded as a cheap substitute for fresh meat, but under dearth or privation, when all the usual resources of animal food fail, it would undoubtedly be the means of sustaining life. Its perfectly dried state renders it as imputrescible as quill, and it might, therefore, be available as food, in a highly condensed form, on voyages or land expeditions, in which provisions, in some form or other, must be carried.

Agricultural Engineering.

HOWARD'S STEAM CULTIVATOR IN BOHEMIA.

AN occasional correspondent of *Bell's Weekly Messenger* gives the following interesting account of the working of Howard's Cultivator on Bohemian plains :—

German railway goods' traffic has almost been at a stand-still lately; indeed, so much inconvenience has been experienced, that the victorious army is to *march* back from Paris.

Owing to the railway delays, a set of Messrs Howard's tackle, which had been ordered by an enterprising agent to work publicly at the Prague Show, did not reach there till the Show was over. However, the question was an interesting one for the Bohemian sugar beet growers, and it was resolved to have separate trials of steam ploughing, deep ploughing, ridging, digging, cultivating, and harrowing, to which all Austrian agriculturists, and especially those of Bohemia, should be invited.

Accordingly, on the 20th, 22d, and 23d May, a considerable number of agriculturists and others, including professors from Prague University, Vienna, and various agricultural colleges, assembled at Hostiwitz, about 9 miles from Prague, an estate of his Majesty the ex-Emperor Ferdinand, who abdicated at Vienna in 1848.

The field was over 100 acres in extent, the soil a fine loam, with a little clay at about 12 inches below the surface, and was without a stone, root, or other obstacle of any kind, to cause stoppage or delay.

By setting out the rope askew, a clear run of 500 yards between the anchors was obtained, and sufficient coal was brought to the engine for three days' work. It is certain that the roundabout system of steam ploughing is gaining ground in Germany. In fact it is found that the double traction engine system however brilliant it may appear at a Royal Show, does disappoint the hopes of Continental purchasers in actual work, for the following reasons :—The utterly bad state of agricultural roads, which cause distress and wear and tear to the engines; the difficulties of removing heavy engines from the railway trucks, owing to the absence of proper docks and cranes; the inaptitude of Continental workmen to deal with such complicated engines; and the want of repairing shops.

Indeed, when we consider how much of the life of a railway locomotive is spent in the repairing shop, we cannot be surprised at the cost of maintenance of road engines which have such friction and jolting to contend with, as is unavoidably presented by the rough surface, mud, stones, and dust of a farm road, the condition of which varies with the barometer.

Suppose a roundabout set costing £600 complete, will plough 10 acres 10 inches deep per diem, that is, perhaps, not much for a sugar beet grower, still he finds that a double set of traction engine tackle, which costs three times as much, does not do more than 20 acres a-day when in full work; but as either one engine or the other is often disabled, owing to the state of the roads, or the incapacity of the men, and the stoppage of one engine involves the stoppage of the other, the little tackle beats it in the end both in quantity and economy. It is something like the fable of the hare and the tortoise.

Thrashing machines are now so well known on all the large farms of the Continent, that the driving of an ordinary portable engine involves little difficulty or expense. Natives can do this kind of work almost as well as Eng-

lishmen. Then the roundabout tackle is so simple that an ordinary labourer can understand it without much tuition.

It is a great nuisance to be constantly carting coal and water after the traction engines; whereas, with the roundabout system, as in thrashing, the coal and water are brought to one place, and the engine stands as for thrashing.

To return, however, to the Hostiwitz trials: the four-furrow steam plough moved 42 inches width of soil, 9 inches deep, once up and down the 500 yards run in twelve minutes, including shifting of the anchors—the whole of the five men and two boys being Bohemians, who had seen this, their first steam plough, only two days previously—or say 12 English acres in ten hours. Such a result was most satisfactory.

With the cultivator working with five tines, the speed and width were increased, and this especially was the work that charmed the Bohemian sugar beet growers, the land being disintegrated at one operation.

The ten-feet wide steam harrow, working 10 to 12 inches deep over the plough and cultivator work, caused increased delight, by the fineness of the tilth produced, and many declared that they would have their land prepared by steam next year.

The tackle was purchased by the estate agent of his Majesty the ex-Emperor Ferdinand for the Hostiwitz estate, and a careful account is to be kept of all expenses and work done during the ensuing autumn.

The engine was a 12-horse power double cylinder portable by Clayton & Shuttleworth, which had done three years thrashing on the farm. It blew off at 60 lb. pressure, and with the governors off made one hundred and forty revolutions per minute.

There was no hitch or accident of any kind during the three days' trials. Noblemen, gentlemen, professors, and workmen, were all satisfied.

English farmers should see the sugar beet fields of the Continent at this season. Such clean farming cannot be excelled anywhere; the land is as clean between the roots as a brushed coat. Some of the large landed proprietors on the Continent use English implements to a considerable extent. In one court yard belonging to a landed proprietor near Prague, we saw standing eighty of Howard's ploughs, twenty of their reapers and mowers, a long line of their horse rakes, half-a-dozen of Priest & Woolnough's drills, a couple of Clayton & Shuttleworth's portable engines and thrashing machines, also several Crosskill rollers. Bentalls & Turner's mills, and Richmond & Chandler's chaff-cutters, are also much used in Bohemia. At one station, we passed a whole train of forty-two trucks entirely full of Howard's implements. Agriculture is unquestionably making rapid strides in Bohemia, the high price of meat and the profits from sugar beet growing, acting as powerful stimulants.

The Farm.

IMPORTS AND EXPORTS OF AGRICULTURAL COMMODITIES.

THE first half of the present year shews a large increase in the import of oxen and bulls from foreign countries, and the surplus in cows is still more marked. The total number received of the former class, was 60,976, of the latter 17,995, to compare with 52,286 and 6686 in the corresponding six months of last year. We cannot say that we look upon the increase of foreign cows as a gratifying fact, as we are much afraid not a few of them find their way into byres instead of the slaughter-houses, and do harm there to home produce. The values of the animals were respectively £1,027,822, and £270,322, up to the end of June, as against £938,310 and £104,164, a difference in the aggregate of £255,660 on beef alone. The expense, however, is not so great as in the corresponding period of last year, when the total for oxen, bulls, and cows reached £2,021,176, or £723,042 more than in the first half of this year. Calves were a shorter supply than in 1870, but larger than in the half-year of 1869. The numbers received during the six months of this year were 13,264; in the first half of 1870, 14,227—the respective costs being £44,748 and £56,694.

The sheep and lamb supplies also shewed an increase both on the month and six months. In the longer period, the number landed on our shores amounted to 381,963, as against 337,500 in the corresponding period of last year, and the money we expended, up to the end of June this year, was £706,781, to compare with £558,330, in 1870. There was a decrease, however, in pigs, to the extent of upwards of 3000, and in their value to upwards of £21,000. The total amount paid for live cattle and bacon, of which we imported much more largely this year—viz., 524,721 cwt., as against 341,459 cwt. last, the amount paid this year being £1,339,651, to compare with £1,029,732 last year, up to the end of June—was £3,620,822 during the same term of last year £2,840,434, or, in round numbers, £800,000 less.

But these figures do not fully represent how far we are indebted to the foreigner for animal food. We had, besides, of salted beef, 192,705 cwt., and of fresh or slightly salted, 10,679 cwt., which, in the case of both, was nearly double the quantity received up to the end of June 1870; and in regard to money, more than double the amount paid last year, the respective sums being £420,040, and £27,143 to contrast with £199,087, and £19,308. In addition, we have other meats, fresh, salted, or preserved, the aggregate value of which reaches to £255,837. For hams, of which we imported 29,412 cwt. in the half-year, as against 19,800 cwt. in the like term of 1870, we expended £94,269. Pork, fresh and salted, was in very much larger demand this year than last, and for this commodity we paid £558,880; and for poultry, game, and rabbits, which were not received to the same extent as in the corresponding period of 1870, we disbursed £61,579. The aggregate of the last articles enumerated is £1,296,196, which, being added to the sum expended on live stock, makes a grand total of £4,917,018, which we have had to give to the foreigner in six months for animal food alone. It is believed by many that more careful attention to the health and treatment of stock at home, would enable us to retain in our own pockets a large portion, if not the whole of this sum.

Our imports of butter and cheese for the six months have in both cases been greater, as indeed they have been on the month, in

comparison with those received last year. Of the former, we received 602,451 cwt., paying for it £3,170,124, and of the latter 351,521 cwt., at a cost of £1,006,959.

The quantity of wheat imported was also greater than last year, looked at both in the month and six months, and the cost more than proportionately great. The total quantity received during the half-year just ended, was 14,753,558 cwt., to compare with 13,843,124 last; and the cost was, for the first six months of this year, £8,717,736, as against £6,777,696. Russia and the United States were our largest creditors, supplying, in nearly equal proportions, all within two million cwt. of the whole.

The following tables shew the quantities and value of our imported corn produce, and the countries whence it came:—

QUANTITIES.

Wheat.	Month ended June 30, 1870. Cwt.	Month ended June 30, 1871. Cwt.
Russia	4,563,334	5,906,640
Denmark	221,187	14,340
Germany	1,691,927	1,327,310
France	17,377	38,246
Austrian Territories	42,327	191,546
Turkey, Wallachia, and Moldavia	272,605	573,538
Egypt	95,550	35,611
United States	6,081,277	5,619,861
Chili	187,020	136,457
British North America	580,655	734,826
Other Countries	89,865	175,183
Total	13,843,124	14,753,558

VALUE.

Russia	£2,033,840	£3,377,868
Denmark	105,013	9,370
Germany	919,385	878,761
France	8,581	21,248
Austrian Territories	19,304	119,229
Turkey, Wallachia, and Moldavia	116,200	308,230
Egypt	40,702	19,598
United States	3,083,597	3,365,300
Chili	107,668	92,132
British North America	301,535	417,729
Other Countries	41,871	108,271
Total	£6,777,696	£8,717,736

QUANTITIES.

	Month ended June 30, 1870. Cwt.	Month ended June 30, 1871. Cwt.
Barley	3,824,222	3,412,248
Oats	4,467,633	3,898,586
Peas	879,425	473,829
Beans	768,002	1,122,508
Indian corn	6,498,538	5,422,705

VALUE.

Barley	£1,476,679	£1,382,765
Oats	1,669,859	1,409,724
Peas	350,017	210,912
Beans	315,277	512,592
Indian corn	2,133,410	2,157,011

QUANTITIES.

Wheat Meal and Flour.	Month ended June 30, 1870. Cwt.	Month ended June 30, 1871. Cwt.
Germany	548,281	446,788
France	555,968	1,224
United States	1,105,782	1,156,672
British North America	62,357	94,416
Other Countries	203,828	415,065
Total	2,476,216	2,114,165

VALUE.

Germany	£362,744	£415,644
France	392,809	828
United States	702,765	879,395
British North America	42,451	69,358
Other Countries	135,921	409,440
Total	£1,636,690	£1,774,665

There is a decreased supply of eggs, wi a rise in value. The number of great hu dreds (120) received in the course of tl half-year has been 1,825,458, as agair 2,075,144 last; and the expenditure this h year, £665,417, to compare with £608,77 so that "eggs *is* eggs now."

Potatoes have arrived in much small quantities. In the six months, we took on 230,634 cwt., as against 435,998 cwt.; a we paid this year for the tubers, £81,521, contrast with £151,205.

Clover and grass seeds we have had larger supply, the quantity imported bei 232,148 cwt., against 152,685; and the r spective values, £658,830 and £448,58 Flax seed and linseed were also operated i

upon a more extensive scale than in the first half of 1870, and for rape, the demand was almost doubled. Cotton, for feeding purposes, is being more thought of, the quantity imported this year being 112,940 tons, to compare with 79,178 in the corresponding period of last year. The sum paid for it in the half-year reached the respectable total of £1,005,111, while in the same period of the previous year, only £710,694 was expended.

The importation of oil-seed cakes is also largely augmented. This half-year, the receipts were 79,480 tons; in the like term of 1870, they were only 63,790, and the respective costs were £750,713 and £551,511, shewing an extra expenditure this year of nearly £200,000, which is no doubt mainly attributable to the short supply of home-keep last year.

Of hops, we had a large increase in quantity—about 17,000 cwt. more than in the first half of last year—but the price was so much lower this year, that we actually spent about £20,000 less for 84,836 cwt., than we did for 67,609 cwt.—the sum paid for the lesser quantity being £269,714, and for the greater, only £250,378.

With reference to manurial substances, we note that about 11,000 tons of bones have been received in the six months more than we received in the same space of time last year—viz., 45,582 tons, and the cost thereof was £288,873. In guano, there was a falling off in the month, but an increase in the longer period for which the statistics are made up. The total quantity received up to the end of June, was 131,591, as compared with 118,598 at the same time last year, and the expenditure £1,508,757, as against £1,430,298. Nitrate of soda shews a falling off in the month, but an increase on the six, the quantity received up to the end of June this year, being 791,613 cwt., to compare with 556,900 cwt. last, and the costs respectively stand £626,775 and £453,042.

There is a decrease in the quantity of wool received in the month, but an increase in the half-year of nearly 22,000,000 lb., the total amounting to 191,561,389 lb., against 69,821,340 lb. The largest contributors to the increase is British India, our South African possessions, Europe, and "other countries" not specially designated. For all the extra quantity, the expenditure was only £10,000 more, shewing those classes of wool are much lower than they were last year.

The subjoined tables give the quantities from the various countries, with their values, for the six months.

QUANTITIES.

	Month ended June 30, 1870.	Month ended June 30, 1871.
Wool, Sheep, and Lambs.	lb.	lb.
From Countries in Europe	6,603,104	14,157,217
,, British Possessions in South Africa ...	15,367,167	17,042,508
,, British India	4,021,284	11,349,841
,, Australia	135,928,213	134,735,288
,, Other Countries	7,901,572	14,276.535
Total	169,821,340	191,561,389

VALUE.

From Countries in Europe	£347,290	£739,644
,, British Possessions in South Africa ...	1,002,337	895,783
,, British India	128,207	386,930
,, Australia	8,619,271	7,833,611
,, Other Countries.....	241,859	492,160
Total	£10,338,964	£10,348,128

Referring now to the export side of articles of British and Irish agricultural produce, we find that there was a slight increase in the month in the export of butter, but a falling off in the quantity sent away in the six months, the figures for the first half of this year standing at 24,553 cwt., and in the same period of last year, 26,153 cwt. But butter was much dearer this year, the sum put into the pockets of the exporters reaching £148,829, while last year the larger quantity only made £137,664.

Cheese was in about the same demand as last year, 11,402 cwt., against 11,592 cwt., and the price was much the same, £46,364 having been received this year—last year, £50,895.

The export trade in horses for France continues to grow apace. In the month of June, we sent to that country 420 horses,

instead of 32 in the same time last year, and in the six months we exported 3584. To other countries we forwarded, in the same period, 832; in all, 4416, for which we received £154,282, or in round numbers about £35 per head. Last year, up to the end of June, we exported only 829, but they realized £55 a-piece.

Our exports of wool amounted in th months to 4,698,578 lb.; in the s period of last year to 3,748,100 lb., and sums obtained for it reached respect £339,041 and £249,875. The Cont was our best customer, Germany takin wards of 86,000,000 lb., France, 82,000 and Belgium, 72,000,000 lb.

HARVESTING IN CALIFORNIA.

WE learn from a writer in the *Rural Pacific* of June 10th, that harvesting commenced in Sherman Island on the 5th ult., the barley being fully ripe. The reapers are having as much as they can do. The grain is large and plump. The *Argus* of June 3d, published at Snelling, Merced county, says that the farmers in that vicinity also are busily engaged in heading and thrashing, and the reports heard thus far are, that crops are turning out better than expected a few weeks ago. The cool weather which prevailed throughout the month of May was extremely favourable to the wheat crop, and many fields are being harvested that were given up as totally lost.

The *Amador Ledger* says that everywhere along the foot-hills in that county, the ranchmen are busy harvesting, and with but very few exceptions the yield is abundant.

Barley in the vicinity of Gilroy will be ready for harvesting the first of next week.

In fact, everywhere, throughout the central portion of the State, where the drought has not cut it off, the grain is ripening, and the farmers are either ready at work or getting their headers ready for a start. The wheat fields in many localities have improved greatly within the last two weeks, the heads having filled much beyond expectation, under the favourable influence of the late showers and cool, moist atmosphere. The *Napa Register* thinks the late rains benefited the wheat growers of that country at least 100,000 dols. The *Contra Costa Gazette* —"Beyond anything that could have expected, the weather, since the northe the 20th and 21st of April, has been h favourable for the grain, and the harvest be much larger than there was any wa for calculating a month or even a week and every day's continuance of the weather improves the prospect. Fair c of grain will be gathered where none expected a week ago; and many pieces turn out handsomely from which not than one-fourth yield was then looked still the crop of the country will not be than one-fifth of what might have expected with a favourable season."

Yuba, it is thought, will harvest fully third of its usual crop of wheat. The rains and cold weather have worked won

In Santa Cruz, the prospect is quite tering, according to the *Times*. A si report reaches us from Monterey. In favourable localities, even in the San Joa Valley, where little or nothing was expe quite a respectable yield will be real Reports from Stanislaus county are encouraging than was thought possible weeks ago.

Much of the present failure is undoub due to careless and imperfect cultivatior instances of such, in immediate conn with thorough cultivation, and on land cisely similar, have abundantly proven; cannot be denied that large tracts of co

that have failed to produce crops this season, would have done so under any system of cultivation which did not include irrigation.

The fruit in the northern part of the State was not so much injured by the late frost as was at first supposed.

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*FARMING IN THE COLONIES.**

BRITISH COLUMBIA.

WHAT a wide range as a subject, "Farming in the colonies" would offer, were I to discant upon the different modes adoped in the dependencies of Great Britain, varying according to the position, soil, natural growth, water, and other circumstances.

With what labour, patience, and preseverance, the stiff red soil of the Cape is made to yield its harvests. How, in Australia, farming consists of stock-raising, simply acting as shepherds on horseback, driving panting flocks over miles of dried plains, or through sparse bush, from one watering place to another. Even the ryots or farmers of India have their share of interest in the way they stock and clear the jungle, and then dyke the land into the flats for the purpose of irrigation, in order to "riot" in their glorious Paddy fields. These, and many more which I might adduce, however rude to the eye of—to use a colonialism—"high toned" followers of the four-course system at home, would offer to them many useful hints in applying means to an end, the knowledge of which is so necessary in a new country. Be it my province, in this my first paper, to treat of the prospects of farming in this distant colony, when, independent of the general interest of the subject, the present movement of Confederation with Canada has so shot us ahead that we may expect a fair share of attraction, and that emigration will be the consequence, especially when the projected railway across the continent of America *through British territory* is complete.

Hind's exploration for the Canadian Government gives a wonderful account of the beauty and fertility of the Red River valley, and the following quotation is the present computation of the country through which our railway will run. The valley of the Red River of the North is said to contain 60,000 square miles of the richest wheat land in the world. The six New England States contain 65,000 square miles, but a large portion of this area is taken up by mountains. When the Red River valley shall be cultivated, it is estimated that it will produce 600,000,000 bushels of wheat annually.

Hitherto, the gold fields of British Columbia have been the only attraction in this country, and they have naturally led hither every other kind of man but the British farmer. Shoemakers, tailors, tinkers, and sailors, with an army of what are here called loafers, are our farmers, and I have several of each trade in my eye at this writing—one instance will suffice as a reason why such people should take to agriculture. A sailor runs away from his ship, gets to the mines, chance may lead him to make a few thousand dollars, when he comes down, and buys a tract of land which at once is designated a farm, when he employs a lot of his fraternity, in ye-hoing and heave-awaying at every obstacle round his cabin, till his means are expended, when he denounces the country, hitches up, and ships for unknown parts. The same with the others, all have the idea of owning an estate, fancying that that done they are made men, not dis-

* This paper is written by a colonial farmer of the greatest experience, not only in the colony which it concerns, but in India, Egypt, and England, and his statement may be relied on.—[ED.]

covering till too late that where wages are so high, unless they work and have a knowledge of work themselves, nothing can be made of a farm. A loafer never tries for anything further than a cabin in the bush, a squaw, and a gun, he then shoots enough of deer and game to keep him. And strange as it may appear, so fascinating is this kind of life, that many who consider themselves English gentlemen have descended to it rather than gain an abundant living by honest labour.

There is no doubt, however, but that with all the advantages of this island in point of climate and richness of soil, I must premise that owing to the enormous growth of timber, it is one of the most difficult to *begin* to farm in; but one when the beginning is made the profit is greater than in any part of the world, owing to the enormous mineral wealth of the upper country, or the north and east part of British Columbia, which is mountainous and full of endless wealth, while the southern and western portion, as well as a portion of this island, consists of an unusually productive soil, which, coupled with the genial climate, not only secures one-third more than anywhere else, but without any risk as to harvest. This has been a very wet spring, and it has retarded my operations greatly, for I have a prairie of some 90 acres, which I wanted to break up, but could not manage it, as I found it more troublesome than I anticipated. I have managed, however, to get some 30 acres in with barley, by clearing, ploughing, sowing, and harrowing, as a continuous process, and now, this 25th day of May, although late, I am sowing some chevalier barley, which I am told yields in some fabulous way, it certainly is a beautiful sample, and the colour unexceptionable, the price for malting is generally 3 cents or 1½d. per lb. As I am breaking the prairie up, it is my object to lay down a portion in hay as soon as possible. I therefore intend ploughing and clearing after harvest, and sowing with Timothy grass, as that gives the heaviest hay crop, growing from 4 to 6 feet high, yielding 3 and 4 tons to the acre, and selling never less than four guineas a-ton of 2000 lb. Cattle run upon the wild lands, and do well in summer, and rarely are fed during winter, and never farther than in the straw yard at intervals in snowy weather. Butter sells at 1s. 6d. to 2s. 6d. per lb., and cheese a little less, but there is no one to make decent butter even at these prices, so we allow our calves to run with the cows for want of good dairywomen. My neighbour, St Crispin, having eighteen cows, still bought his pound of butter at 3s.; upon his occasional visits to town, at last was induced to buy a churn, but upon my going to his house, some time afterwards, found the churn kicked out on the mixen. "Why, how is this?" "Oh, bother the darned thing, I would rather be without butter all my days than waste my time with such woman's tricks as that. Why, maister, don't ye write and induce some gals o' the right sort to come out to we, instead of tha Bishop sending oot all the scrat cats and scrapings o' the towns, who knows nothing, and will larn nothing but mischief in this country. Look what becomes of the ship loads who have been sent here of sich like, and where are they?" So I left St Crispin awakening the echoes of his own lonely dwelling, repeating the question of "where are they?" which elicits no satisfactory answer, except from the droning hypocrisy of falsified returns to the missionary societies.

There are men in America who attend to dairies, and I have heard that we should shortly have some established amongst us; but I would rather see some of our small farmers from home come out with their wives and families, and if they have a little capital to settle on a farm of their own, they would do well after a two years' struggle, but they ought to engage with others, who, like myself have the means, in the shape of a good tract of land close to a busy city, with a run for fifty cows, which might be extended to many more year by year.

The great drawback to English farmers here is the difficulty of making *a beginning in a forest* without the knowledge of clearing land, or the appliances for so doing, for independent of the necessity of being a good axeman, which can only be attained on this

side of the Atlantic, there is a knowledge requisite varying with every kind of land, so that either a man is disheartened ere he attains the knowledge, or he expends his capital by paying wages to men who know little more than himself.

Let young couples come out here ready to engage on a farm for a few years when they will acquire that knowledge of Colonial farming which will save them years of labour or a fortune in money. Now, as a basis of remuneration, I would suggest, what I should be willing to agree to myself, that if the man was sober and active, and knew the duties of cultivated ground, with a small capital to find implements, a pair of horses, and a yoke of oxen, say at a cost of £150, I would give him the half of the increase of such stock as I would put upon my farm and half of the produce in cereals, &c. The wife of such a man, if a good dairywoman and could find dairy utensils, I would give the half share of all she made in butter, cheese, and poultry, and that would be at once realizing some £150 as a net profit, with an annual increase of £100 a-year which could be obtained with very little outlay.

The drought in the summer, and the light friable nature of the surface soil, preclude pasturage, but there are spots which have a depth of clay underneath, with streams of water winding through flats such I am the happy possessor of, which will, I think, graze as well as any in England.

THE DISEASES OF STOCK.

THE *Veterinarian* (edited by Professor Simmonds) of last month, gives the following account of the diseases to which animals are most frequently subject.

CATTLE PLAGUE.

Our information from the Continent with regard to the cattle plague is to the effect that the malady still prevails in several circles in Galicia, especially in the district of Tarnopol. The plague has also been reintroduced into Lower Austria, and has broken out in two villages near to Vienna. According to the latest information, it was hoped that the disease had been effectually exterminated in Bavaria, where it had recently made its appearance. From France, the information is not sufficiently precise to enable us to say what the true state of things is in that country. There are, however, reasons to fear that the disease, although less prevalent in some districts, is very far from being exterminated in the northern and eastern provinces. By an Order of Council, dated June 10th, Belgian cattle—the importation of which had been prohibited—are again to be admitted, and dealt with as animals coming from a scheduled country.

PLEURO-PNEUMONIA.

Pleuro-pneumonia still prevails in many parts of the country, and within the last month some serious outbreaks have taken place in the home counties, and also in the western and northern parts of the kingdom. In our last month's report, we stated that an increase in the number of infected counties existed as compared with the corresponding period of the previous month. We have again to notice another, although slight increase. The infected counties in Great Britain now number forty-four, and forty-five fresh centres of infection have been added to those previously existing.

FOOT-AND-MOUTH DISEASE.

Very little alteration has taken place with regard to the prevalence of this disease during the past month. Forty-nine counties are reported as infected, having a total number of centres of the disease amounting to 403. In the corresponding week of last year, fifty-five counties were infected, and the centres then numbered 967. Foot-and-mouth disease continues to prevail on the Continent, and to assume, in many districts, a malignant

type. Besides this, the malady is reported to have spread over the whole of the agricultural provinces of Chili north of the Biobo. The losses are described as small, in consequence of the mild nature of the attack. Stringent measures have, however, been taken to prevent the meat and milk of diseased cattle being disposed of.

BLACK-LEG IN YOUNG CATTLE.

That remarkable blood affection known commonly as "black-leg," has again appeared in a sporadic form in several parts of the country, and under circumstances apparently the very opposite of each other. A correspondent in Norfolk writes us:—"I have just been called to a lot (twenty-two in number) of home breds, whose ages vary from six to twelve or fourteen months, among which "the murrain" has broken out in a severe form. Seven are dead, and I fear others will die, notwithstanding that all of them have been bled and setoned, as is our usual practice. My fear is increased by the circumstance that three have died since the treatment was commenced." Similar reports have reached us from other sources, some of which clearly shew that the disease was evidently due to an improper use of highly stimulating food. The forcing system requires far more supervision on the part of the owners of animals than it often receives. Too much is left to the herdsman, who rarely fails to daily cram the animals to an extent far beyond what the organism can assimilate. The eye and the better knowledge of the master would often prove efficacious in preventing disease, were they more generally brought into use. The old aphorism, "'Tis the last ounce which breaks the camel's back," should be ever before his mind in its practical application. If this were so, his complaints of losses would be far fewer than they often are. Curative measures have been found to have but little influence in arresting blood diseases, nor is it to be expected they ever will be very efficacious. Almost before any ordinary symptoms of disease are observed, the vital fluid has passed into a condition which no known medicinal agents can at once restore. Blood poisoning and death frequently succeed each other with a rapidity that few persons can understand, except the scientific pathologist. Although no sure reliance can be placed on curative measures, the same cannot be said of preventive means. These are of the greatest value, and often are found to act with a rapidity and power which are really surprising. Antiseptic agents stand foremost in this class, and among them the alkaline sulphites, conjoined with the spirituous tinctures of bark, ginger, gentian, pimento, &c., commonly known as diffusible stimulants, are to be preferred.

PARASITIC WARBLES IN HORSES.

The long-continued hot and dry weather of last year seems to have proved exceedingly favourable to the development and preservation of every variety of the gad or breeze fly; and hence not only have sheep suffered this season to an unusual extent from larvæ of the fly within the frontal sinuses, but horses and cattle have been affected with warbles far beyond what is generally observed. Numerous cases of these parasitic productions have been brought to our notice in horses; and one correspondent, Mr Steele of Sheffield, has sent us some very good specimens of larvæ from the horse. We have not yet, however, been enabled to obtain any larvæ which were sufficiently matured to assume the perfect chrysalis form; and hence we are likely to remain without specimens of the horse warble-fly. Can any of our readers supply this deficiency? They would not only confer a personal favour on us, but would assist materially in settling some imperfectly known peculiarities in the several varieties of the breeze fly. Warbles on the backs of bullocks are common enough, but it is only occasionally that they exist, and then to a limited extent, on horses in this country. The larva of the ox greatly exceeds in size that of the horse, and changes earlier from a white to a brown or black colour. Essentially, however, their natural development is the same in both animals.

SHEEP SHEARING IN ABERDEENSHIRE.

ERDEENSHIRE is noted as being one of the most progressive counties, agricultural way, in Scotland. Its manur- s cropping, and its breeding and its feed- cattle more especially, is unexception- but it is very much behind in its mode of the fleece off the woolly people, if re to believe one of its own farmers, ohn Burgess, Home Farm, Park Hill, as made sheep his special study for a r of a century. In a letter to the *een Free Press*, Mr Burgess says:— shearing throughout Aberdeenshire lly is conducted on something like llowing principle:—A day having been part, all the available hands in the r are bespoken. Thus the turn-out erally pretty numerous. Some are set to catch sheep, some to bundle wool, the remainder, the greater part of are often females (females being un- to the former duties), repair to some nient spot to try their hand at extract- e sheep from its fleece. So far well. y tale is not ended. The wool having removed from the belly, and the four ed together, the operator commences and slash with his (or her) shears in ections without the slightest pretence thod or design of any description, and imes removing about as much of the ith the fleece as is left on the carcase e sheep. As a consequence, by the he poor animal is set at liberty, it is ly often lame from the effects of the n its shanks, but its otherwise graceful is decorated with furrows or "shear ," which remind one very forcibly of a dman trying to cultivate his field by ing part of it south, part north, part art west, and part of it at right angles. some of the more northern, and in all the southern counties of Scotland, shearing is conducted on a much more scientific, and certainly far more humane principle than that just described. In the latter counties, a few select hands having been engaged, shearing commences, as in the former case, by removing the wool from the belly; but that being done, instead of having his feet tied, the animal is supported (sitting on its hind quarters) by the knees and one hand of the operator, until the fleece has been removed from the head to a little past the fore-shoulders. That done, the sheep is laid on its side at full length (its legs being at liberty all the while), the operator continuing to ply his shears from the under parts to the back bone (right and left), until the whole of the fleece has been removed. By such a method, when the animal is set at liberty, instead of being the unseemly creature which we are accustomed to look for in a newly shorn sheep, the well-defined and regular shear-marks that encase its body (like straight-held lea furrows over a hill) add gracefulness to its already stately form.

Some people think, or, at least, say, that there are only a few weeks between a well shorn sheep and an ill. Such, however, is all "gammon," and can only be the fruit of an imagination void alike of taste and design. Laying aside altogether the satisfaction one has in seeing his sheep as nature produced them, experience bids me say that in the case of fat sheep, a neatly clipped animal will fetch from 1s. to 2s. 6d. more in the fat market than a badly clipped one of the same weight and quality will do; and I feel satisfied that the rule does more than hold good in the case of keeping or breeding stock.

Tardy as Aberdeenshire has been hitherto in this matter, transpiring circumstances lead me to infer that not only in the particular branch of shearing, but in the general management of sheep, Aberdeenshire will yet, as she has done in other enterprises, sit a queen among the counties of Scotland. In the

Cromar district, a society has now been in working order for years, the object of which is the improvement of sheep-shearing. I saw by the reports of last year's competition, that the judges gave their awards where they found the fewest skin cuts, without regard to design or method. I think, however, that they would forward the interests of the cause in question, if this year they would make their awards where they found best designs, coupled with fewest skin cuts. A society has also been formed lately, the head-quarters of which I take to be Aberdeen, the object of said society being the improvement of *Leicester* sheep. Now, although some think this society somewhat class or one-sided, still, as the committee comprises many gentlemen of standing, not only in Aberdeen, but in the counties of Banff and Kincardine, some of them men, too, who have taken a deep interest in the cause in days gone by, I feel quite sanguine that better days are in store for the—in but too many instances—badly-managed flocks of Aberdeenshire. Might I suggest that this society—of which the Earl of Fife is president—should watch over the interests of sheep-shearing, in conjunction with the improvement of the breed? Those favourable could have their flocks entered for competition, under given regulations, and prizes, medals, or honourable mention, awarded to the best shorn flocks. Some plan, in substance like the above, would, I think, draw forth much more interest in the cause than two or three sheep picked from the respective farms and entered in competition would do. And besides, although it is well that our show sheep be neatly shorn, it is no less well to attend to the interests of the whole flock. Let sheepmasters give their shepherds their co-operation and approbation, and let all join in instilling into the rising generation that if the work be worth doing, it is worth doing well. The cost price between a neatly and a badly shorn sheep will not even in the extreme cases exceed 2d. a-head, and usually not more than half that sum. And laying aside the difference, already referred to, in the market value of the respective animals, the feast the sheepmaster gets to his eyes in a neatly shorn sheep will far more than repay him for the odd pence incurred in having his sheep neatly shorn.

STEAM CULTIVATION.

THE following is the full text of the memoranda made by Professor Wilson, of the Edinburgh University, and Mr P. B. Swinton, Holyn Bank, upon the working of the Thomson engine and Fisken's system of steam cultivation, to the Highland and Agricultural Society of Scotland. They will be read with interest at the present time.

The ploughing took place in a large field at Dunmore Park, which had lain about 40 years in grass, and was nearly level. The soil was a strong clay, and in good order for ploughing. The engine is of 8-horse power, and weighs 7¼ tons, with vertical boiler and cylinders. It runs on three wheels, with india-rubber tyres, each 2 feet broad, and covers a space ~ feet wide. The steam-guage, when the engine was drawing the plough, indicated a pressure of from 120 lb. to 125 lb. per square inch. Five cwt. of coal and 700 gallons of water are stated to be consumed in a day of nine hours. The plough is a balance-plough, made by Gray of Uddingstone, and is the first of the kind which has been constructed. The plough had three mould-boards. The engine travels on the unploughed land, dragging the plough behind it. The length of furrow was 12½ chains, or 275 yards. The furrows made by the plough were 6 inches deep by nearly 9½ inches broad, and were fairly turned, considering that the ploughman had not much experience of the work. A heading 20 yards wide was left at each end of the field for turning the engine. To travel the distance of 275 yards and to turn the engine, and attach it to the plough ready for the return journey, occupied a space of eight minutes; and this required considerable activity on the part of the engine-driver when turning the engine. The

was driven by one man, with a boy to attend the
l watch the pressure and water-guages. The
carried a supply of coals sufficient for four
work and four hours' supply of water. The
ı was steered by one man, whose duty also was
k and unhook the engine to the plough at the
ncement and end of each journey. At the
: which the engine and plough were working,
hree furrows 28 inches wide and 275 yards long,
; square yards, in eight minutes, the time re-
l to plough an imperial acre was within a small
)n of three hours; and supposing the plough to
nine hours a-day, which, taking the average
ı of days in the ploughing season, is a full allow-
it would turn over 3 imperial acres per day, or
what three pairs of horses would have done.
ıs observed that while the three ploughs turn
a space of 28 inches wide, the engine-wheels
a space of 7 feet wide, so that the wheels of the
e pass three times over the land before it is
d by the plough. It was also noticed that the
e passing over the land depressed the surface
1½ inch, and the soil was also compressed to
xtent. The Highland Society's self-registering
ıometer, made by Messrs Easton, Amos, &
rson, of London, was tried on the engine and
furrow plough, and indicated a draught of 21

A common swing-plough, drawn by two horses
ried to ascertain the difference in draught on the
in its natural state and where the engine had
d over, and it was found that the land, where
ressed by the engine, required an additional
r equal to the draught of 1 cwt., the single plough
ıg 6 cwt. on the unpressed land, and 7 cwt. on
vhich the engine had passed over. The com-
: were desirous of seeing the engine and plough
rk on stubble or ploughed land, but Lord Dun-
had no field on which it could be shewn. The
iittee would also wish to see the engine and
h tried in a field with a considerable slope.
Dunmore handed to the committee the follow-
atement of the cost of his apparatus and of the
expenditure in working it :—

of engine, 8-horse power	£700	0	0
of ploughs, three-furrow.....	70	0	0
of water-tank	30	0	0
	£800	0	0
est on 8-horse power engine at 5 per ent.	£35	0	0
eciation in value and wear and tear, per cent.....	49	0	0
	£84	0	0

ving engine to be under steam four days a-week = 208 days, which gives
ls. 1d. as daily cost for engine £0 8 1
ths, cost £70, at 5 per cent: on cost-lay, and 5 per cent. for wear and tear = £7 per annum, and for 100 working days, that would be 1s. 5d. per diem £0 1 5
Tank would cost £30, which at 10 per cent. = £3 per annum, would give for 100 days 0 0 7
Engine driver's wages at 24s. for 6 days 0 4 0
Boy, at 1s. per diem 0 1 0
Ploughman, at 2s. 6d. per diem 0 2 6
Coal, at 4d. per cwt., 5 cwt. 0 1 8
Oil and waste 0 0 6
£0 19 9

Autumn stubbles—in ten hours ploughing we could do 7 acres easily—equal to 2s. 9d. per acre; spring ploughing lea, 5 acres—equal to 3s. 10d.

FISKEN'S SYSTEM OF STEAM-TILLAGE.

Having, together with Professor Macquorn Rankine, been appointed by the Society as a deputation to inspect the working of the "Fisken system" of steam tillage, we proceeded (April 10) to the farm of Offerton Hall, near Sunderland, in the occupation of Mr H. M'Laren, where the "system" has been in operation during the past winter, 440 acres, we were informed, having been ploughed or cultivated on the farm since October last. Professor Macquorn Rankine was unfortunately unable to attend. The farm is of an undulating surface of about 500 acres in extent, and lying on the magnesian limestone. The fields appeared to have been deeply tilled, and the soils, of varying textures, were in a dry and friable condition. When wet, their tenacity would be greatly increased. There were no stones or other obstacles met with while the work was under our observation. Before giving the result of our inspection, it will be well briefly to describe the peculiarities of the "Fisken system" of working: as, although it has been before the public for several years, from various circumstances it has not hitherto taken a prominent position in the competitive trials of steam tillage which have from time to time been held. The "system" differs materially from the other "roundabout" modes of applying steam-power to tillage purposes. The engine which gives off the power may be placed in any convenient spot adjoining the land to be ploughed, on a roadway, or by a spring of water, for instance, and the power given off is conveyed by means of a light hemp rope (½ inch diameter) travelling at a high velocity—say 24 to 25 miles per hour—round the area to be operated upon, and communicating with two windlasses placed on opposite sides (headlands) of the land to be tilled. This high velocity, when communicated to the windlasses, is, by a simple mechanical arrangement, reduced to any desired speed—say 2 to 3 miles per hour. This change of velocity being necessarily associated with the corresponding increase of tension of the ropes in the exact ratio of the rate of reduction of velocity (less,

of course, the amount consumed by friction, &c.) Thus an initial velocity of 30 miles an hour, when reduced at the windlass to 2 miles an hour, would correspond to an increase of tension (hauling power) equal to the rate of reduction—or 15 to 1. A strain or pull of 1 cwt. on the hemp travelling rope at the engine is therefore increased to a strain of 15 cwt. on the hauling rope (steel wire) working between the windlasses. In the transmission of power from the engine to the working implement, a loss will always take place, greater or less in proportion to the extensibility and elasticity of the travelling rope, and to the friction of the various moving parts of the engine and tackle. The implement—whether plough, cultivator, or harrow—is drawn by the steel wire rope backwards and forwards between the windlasses at any speed that may be desired. The mechanical arrangements of the windlasses enable the man in charge to haul them forward at the end of each "bout," and also to stop and start the implement at work the required distance with perfect precision, without communicating with the engine-driver. Owing to some delays in reaching the farm, we found the work already commenced on a 14-acre field, of an irregular parallelogram shape, with a slight but increasing gradient along the line of working. The engine was placed near the entrance, and close to a water-course, from which it pumped its own supply. The engine was one of Clayton & Shuttleworth's 12-horse power double cylinder traction engines, with 8.25-inch cylinders, and a 12-inch stroke, and having a "grooved" fly-wheel 5 feet in diameter, round and by which the travelling rope was driven at the same speed as that of the periphery of the wheel itself. The engine consumed about 1½ cwt. of coal per hour when at full work. The "travelling" rope was ½-inch in diameter, and made of the best Manilla hemp expressly for the work, in lengths of 250 yards, each length weighing about 112 lb. Five lengths were required for the field. The rope, 1250 yards in length, and weighing about 5 cwt., was carried round the field at a height of about 3 feet from the ground on light porters, with friction pulleys placed at distances apart of 50 yards on the tight and 30 yards on the slack side of the windlass. The proper tension of the rope was regulated by a tightening pulley under the control of the engine-driver. While at work we timed the speed of the travelling rope and found it varying from 35 to 40 miles an hour. The "hauling" rope was of steel wire, ⅜ in. thick, and 800 yards long, equal to a straight draught (furrow) of nearly 400 yards long. The implement at work was one of Fowler's reversing cultivators, working 7 tines, and covering a breadth of 6 feet, and set at a depth of 8, increasing to 11 inches. The field had been steam-ploughed with a 10 by 8 furrow in autumn, and was now being cultivated for potatoes. The distance between the windlasses (headlands) was about 200 yards, and the average length of furrow was 190 yards. The double "bout," including the turning at both ends, took from four-an half to five minutes, according to the depth of w ing, giving a working rate of about 2 acres per h (The wire hauling rope, we noticed, was allowe trail on the ground, Mr M'Laren considering that friction and extra wear and tear of rope was equivalent to the cost of porters and attendants.) work was done in a perfectly satisfactory manner; hitch or difficulty was experienced in any of the m ments of the implement or of the machinery. fly-wheel made from 180 to 200 revolutions minute, and the pressure increased from 60 lb. t lb. per square inch, as the depth of working increased. Every part of the machinery appeare be under perfect and immediate control. At request, the cultivator was stopped several times w working 11 inches depth, and started immediat without any apparent difficulty or strain on machinery. The number of persons engaged four—two windlass men, one ploughman, one eng man. From these data it is seen that (at 70 pressure) the engine was giving off a power e to about twenty horses, while the cultivator at its work. Not having any means (dynamom or friction breaks) at our command to see this power was consumed — that is to divided between the working of the engine itsel the "travelling" and of the "hauling" rope, of the windlasses, we could only obtain informa from our Mr M'Laren, who gave us the followin the result of his practical observations :—The eng when working at the rate of 160 revolutions minute, required a pressure of 8 lb. per square to set its own parts in motion, and an increa pressure of 12 lb. per square inch, or 20 lb. in to give motion to the full length (1600 yards) o "travelling" rope. This would be equivalent consumption of rather more than 2-horse powe the engine, and of 3-horse power by the rope, loss of at least 5-horse power before the strain or reaches the windlasses. These details require t tested by direct and careful experiment, as also the power consumed by working the windlas before any just estimate of the effective force or ac working efficiency of the tackle can be arrived Another important element for consideration, w has a direct money equivalent in the calculation the time required to set and adjust the tackle, to it down again, and shift it to another locality. M'Laren informed us that they could begin to w in two and a half hours after the engine and ta reached the spot, and that they could take all again in one and a quarter hour, or about four h in all. Mr M'Laren also informed us that he ploughed a field of 33 acres without having to the tackle at all, and another of 55 acres with having to move the engine, which was pl advantageously close to a supply of water. were also informed that the engine and the w of the tackle had remained out in the fields du

hole of the winter, and certainly without any
ıt deterioration to rope or machinery. The
ıdvantages claimed for the "system," simplicity
conomy of working arrangements and of first
, and general adaptability to fields of varying
ıd shape, appear to be substantially borne out
e practical success it has achieved on Mr
en's farm. Until, however, it has been ascer-
by direct and careful testing what amount of
is consumed by friction, &c., and what amount
: is consumed by the arrangement of the tackle,
ıot possible to give any judgment as to the
al efficiency of the "system," or its comparative
ıical application. If the verdict on these
be satisfactory, we shall no doubt soon see
r and a powerful competitor for public favour
field of steam tillage, and Mr Fisken will be
! to the thanks of the agricultural community for having successfully worked out a new mode of applying steam-power to the mechanical forces of the farm.

P. B. SWINTON, Holyn Bank.
JOHN WILSON, Edinburgh.

Edinburgh, April 28, 1871.

Note.—Although we have said that the rate of working of the apparatus when under our observation was about 2 acres per hour, it is right to mention, that having left the field for about an hour, on our return we found that the amount of work done in our absence was only equal to 1¼ acre per hour. From whatever cause this arose, there did not appear to be any want of steam-power, as when the engine was stopped, steam immediately blew off from the safety-valve.

P. B. SWINTON.

Our Library Table.

Cultural Directions for the Rose. By John Cranston, King's Acre, near Hereford. Third Edition Revised. London: Robert Edmond Taylor. And John Cranston's Priced Catalogue of Selected Roses.—1871.

No flower commands such universal admiration as the rose, and being taken under the care of all plant cultivators, from owners of the most limited city window garden upwards, cultural directions for its management are highly desiderated by growers of all grades, and none who may become possessors of this little book will be at a loss for any information they may require; for, in the First Part, the following with other particulars are concisely and satisfactorily treated, viz., the most suitable soils, situations, and manures; planting, propagating, pruning, training, protecting, curing of diseases, prevention of insect pests, &c.; while Part II. contains a selection of the finest roses in cultivation, with full descriptions of each under eighteen sections or tribes of summer, and eleven of autumnal roses, to which are added seventeen select lists of sorts, adapted to various circumstances, soils, &c., and, in conclusion, a calendar of operations is given for each month throughout the year.

Many are deterred from cultivating the rose to the extent they would like, from an idea that their situation or soil is unsuitable. Thus, town gardens where smoke prevails are usually looked upon as being inimical to rose-growing, yet a selection of one hundred kinds is given that will thrive in such places. Those black porous soils that are usually met with in town gardens, as well as those of gravelly and light sandy natures are looked upon as the worst for roses, but modes are pointed out whereby even they may be made at least highly, if not perfectly suitable.

A rich, deep, stiff loam is what roses most delight in, and the manures best adapted for them are pig or cow dung, after being rotted in a heap for two or three months; many villa gardeners cannot, how easily procure either, for few care to dispose of soil, and the preparation of the manure in the m indicated, even if it can be got, is often unallo for sundry reasons. Farmers are seldom, how classed among them, unfortunately, as they can rally command plenty of both proper soil manure for a moderately sized rose bed, and a their garden soil not be naturally adapted for growing, carting it away, and replacing it with p soil, from some part of the farm, need be m troublesome nor expensive. Hence, those of them have turned their attention to rose growing generally succeeded well, but with their advan the wonder is that so few take rank among rosa Complete as this treatise is, we would suggest fo author's next edition another two selections of —viz., one of double roses suitable for introd into woodlands, hedge-rows, game covers, and park scenery; and one of single roses for purposes; for among the former are many growers that are capable of permanently mai ing their places in defiance of the other exub vegetation of such places, and the universally mired elegance of our wild briars would be g enhanced by being intermingled with the dif colours and varied growths of exotic species, as those with yellow flowers, the almost gig growing kinds of the Himalayas, some of the distinct featured sorts from America; and the of those hybridal autumnal blooming varieties, w although in every way suitable, are now inva cast away by rearers of new kinds, for the s reason that they are only single. In the Priced logue, all are described and arranged under the rent sections to which they belong, and while d ing new sorts are liberally introduced, really torious old kinds are also retained.

The Garden.

SETTING OF THE FLOWERS OF THE VINE.

HE following paper on a most important subject appeared recently in *'ardener's Chronicle*, and at the request valued correspondent we reproduce it e instruction of the readers of THE RY GENTLEMAN'S MAGAZINE :—

e questions that have lately arisen as e setting of the flowers of the Vine, he advantage or disadvantage of syring- iem during this process, have led us amine the construction of the flower eral of the varieties. We were also us of ascertaining if possible what were ircumstances rendering any particular a free or a shy setter, as the case may To this end we applied to Mr Barron, indly furnished us, from Chiswick, with nens of some twenty or more varieties, enting most of the classes of Vines. It e well to cite the names of the flowers ned :—Golden Hamburg, Black Ham- Dutch Hamburg, Muscat Hamburg, Prince, Esperione, Chasselas Musque, Tokay, Gros Colmar, Tyningham it, Muscat of Alexandria, Muscat Noir 'aples, Muscat Orange de Portugal, it Noir de Jura, Frankenthal, Royal idine, Morocco Prince, Aramon, Trent- Black, Balafault, Black Alicante, Black ikka, Black Morocco.

ing aside minor differences in form and ie essential structure and the mechanical ients for securing fertilization were the in all the varieties examined. Before ng further to these special instances, it e well to advert to a few leading prin- relating to the fertilization of flowers in l, and for extending and calling re- l attention to which the physiologists r day have to thank Mr Darwin. We see, too, that the gardeners also lie under obligations to this most painstaking observer and thoughtful *savant*. Up till recently there had been a prevalent impression that a flower was, in the majority of instances, necessarily set by its own pollen, except, of course, in the case of uni-sexual flowers. The occurrence of stamens and pistils in the same flower, and the manifold contrivances for insuring the contact of the pollen with the stigma, naturally enough led to this inference.

Sprengel was the first, or one of the first, to shew that this inference was not wholly correct. He pointed out that often when the anthers were fully developed and the pollen ripe, the stigma of the same flower was still imperfectly developed, and *vice versa*. He shewed that many of those arrangements for ensuring fertilization were really so contrived as to prevent the setting of a flower by its own pollen, and to facilitate the fertilization of one flower by pollen derived from another, the pollen being conveyed from the one flower to the other by bees, the wind, or other means. A flower, hermaphrodite as to structure, was thus shewn to be frequently of one sex only as regards function. Then came the remarkable experiment of Darwin on Primroses and other flowers, and in which that physiologist was enabled to demonstrate positively that the fertilization of a flower by its own pollen was often, we may say very often, positively detrimental to the welfare of the species—detrimental in this way that, in cases where a flower is fertilized by its own pollen, the number of seeds produced is very markedly less, and the health and vigour of the resultant seedlings also diminished, as compared with what is the case when pollen from another flower or plant of the same variety is employed to fertilize the stigma.

The record of these experiments soon set observers to work. New facts and illustrations poured in, all attesting the general accuracy of Mr Darwin's conclusions. Mr Scott, formerly of the Royal Botanic Garden, Edinburgh, now of the Calcutta Botanic Garden, brought forward some striking evidence. In Germany, Professor Hilderbrand has worked much in the same field, and it is to him that we owe a general systematic account of the diversities in the mechanism of the fertilization of flowers. An abstract of Professor Hilderbrand's classifications was published in the *Gardener's Chronicle* of 1867, p. 687, and we strongly advise all gardeners troubled with shy-setting Vines or blind Strawberries, all florists or hybridists desirous of succeeding with their crosses, carefully to study that paper, and also Mr Darwin's observations above alluded to. A brief *resumé* of these points will be found in the second edition of Henfrey's "Elementary Course of Botany," page 614. For our present purpose the general result may be stated to be this, viz., that the majority of flowers are fertilized with pollen not their own, even though self-fertilization is not impossible, and does sometimes occur; that in many cases self-fertilization, *i.e.*, with their own pollen, is rendered absolutely impossible; that in some cases self-fertilization is the rule, though, even then, ways and means are provided by which an occasional cross is obtained; and lastly, that in a very small proportion of cases, self-fertilization alone is possible.

Reverting to the Vines, let us see under which category they fall. Every gardener knows that the petals of the Vine cohere at their tips, so as to form a cap, which is pushed off as the flowers attain to maturity. He knows, too, the general form of the flower to be thicker at the free end than at the end nearest to the stalk, and that there are usually five stamens surrounding the pistil, which latter will ripen into the Grape.

Now, if a fully developed flower be opened with the point of a penknife, or a needle, just before the falling off of the hood of the petals, it will, in most cases, be seen that the pollen, or some of it, has already been shed on the stigma. Moreover, if a flower be examined, in which the petals are half pushed off, it will be seen that, by reason of the form of the petals, narrow below, broad above, the anthers must necessarily be pressed against the stigmas, as the corolla falls off. Clearly, then, in the case of the Vine self-fertilization does occur. Every provision is apparently made for it. Moreover, as the pollen is at least partially shed before the cap of the petals falls off, it follows that syringing can at least do no harm, as the water does not gain access to the pollen, while it may do good by shaking the flowers, and causing them to liberate their pollen, and disperse it over other flowers of the same or other branches, and thus promote that cross-fertilization which all observers agree in considering so beneficial.

Cross-fertilization, in the case of the Vine, is provided for in various ways; thus, as the petals fall off they liberate the anthers from contact with the stigma; and as the stamens fall back with a jerk as the cap is removed, the pollen is thus scattered.' If a bunch of flowers be shaken by the wind or by a blow with a stick, or what not, the pollen flies out in showers, and some of it, at least, falls on another flower. Again, the exquisite perfume and the honied treasures of the flowers offer great inducements to insects to visit the flowers; the insects get, in consequence, well dusted over with pollen, and then fly off to some other flower, and there, while intent on their own selfish ends, unconsciously set the flower with the pollen they have removed from the flowers previously visited.

We have now to allude to the reasons why certain varieties are "shy setters," and these are not far to seek, though it must be borne in mind that some of them apply in some cases, some in others, and that the same Vine may at one time owe its barrenness to one cause, while at another this undesirable quality may depend on some other circumstance. Taking it as proved to demonstration that self-fertilization is, as a rule, injurious (comparatively so); and bearing in mind that self-fertilization generally occurs in Vines, we

have at once a good reason why "shy setting" should occur; and if it be objected that this is against Nature, we must remind the objector that it is the gardener who wants the Grapes, not the Vine itself. A large crop of Grapes, frequently repeated, may be very desirable for the gardener, but it is not so to the plant, which is naturally one of long duration and vigorous growth, having, therefore, comparatively little reason for multiplying its kind. The gardener by his art and care makes his Vines bear great crops, but they sometimes are revenged on him by shanking and other evils. Self-fertilization, then, has an unquestionable tendency after a time to induce sterility.

Another reason for shy setting may be found in the circumstance that the pollen may be ripe, while the stigma on which it falls may still be immature, not "receptive," as the botanists say, or *vice versa*. We found numerous illustrations of this want of synchronism in the flowers we examined, and this was not confined to any particular variety, but occurred in different flowers of the same bunch. Of course, if this occurred throughout the bunch, no setting would occur unless pollen from some other bunch were applied at the right moment.

Again, it may so happen that no pollen is formed, and this we found to be frequently the case in the flowers of Dutch Hamburg, Black Morocco, Balafault, Muscat Noir du Jura, Aramon, Morocco Prince, and Chasselas Musque. We do not know if this scanty, or altogether defective formation of pollen is constant in the varieties we have named. We suspect not. We rather suppose that this is an occurrence which may present itself in any or all varieties, more or less, according to circumstances,—that it is, in fact, an indication of that general tendency towards uni-sexuality which finds its maximum in the native American Vines, which are all dicœcious. Sterility might also occur from abortion of the pistil, or of the ovules, but of this we have seen no instance in the specimens before us; the stamens or the pollen have often been defective, never the pistil or the ovules, so far as our observations have yet gone, even in those varieties where the seed is not fully perfected, as in the Black Monukka.

We have thus alluded to most of the structural conditions on which the sterility or fertility of the Vine blossom depends; but as the conditions are, to some extent at least, dependent on variations of culture, degree of vigour, fluctuations of temperature, moisture, time of starting into growth, and the like, we hope some of our celebrated Grape growers will favour us with the results of their observations on the subject at an early date.

THE PANSY.

VARIOUS and familiar are the names by which the Pansy was known in the olden time. The famous old herbalist, Gerarde, who wrote a long description of his pet flower, says it was known as Love-in-idleness, Three-faces-under-a-hood, Jump-up-and-kiss-me, Heart's-ease, Herb-Trinity, and Pansy. The Italians named it Viola farfalla (Violet Butterfly). The wild Pansy is found over nearly all Europe, and in some parts of America.

To Lady Mary Bennett is given the credit of first introducing the Pansy to the attention of florists. Early in the present century, she planted all the varieties which she could procure in her father's garden, or from her friends. With the skilful aid of the gardener, new varieties were raised from seed. From this small beginning may be traced the improvement of the flower, as well as the fashion for its cultivation. Lady Bennett's zeal and industry were soon rewarded

by the increasing beauty and size of the flowers. In 1813, her new varieties attracted the attention of that practical floriculturist, Mr Lee, at Hammersmith, who immediately perceived the profit that might be derived from the cultivation of this flower; and a number of still more beautiful kinds were raised at his nursery. Other nurserymen followed his example, and in a few years the tiny and unpretending Pansy took its place in the first rank of florist flowers.

We must not suppose that these marvellous changes have been wrought by merely transplanting wild flowers into rich garden-soil, and cultivating them with much care. That is only the first step in the march of improvement. The seeds of the finest flowers are preserved, and the finest of the young seedlings are selected for seed. Hybrids are then obtained by fertilizing the stigma of one beautiful flower with the pollen of another equally fine. These hybrids generally retain in a degree the peculiar markings of each parent. Besides partaking of the varied colours of their progenitors, they also possess their peculiarities. Some of the species can thus be freely propagated by cuttings. Innumerable are the varieties now cultivated; there are upwards of a thousand named sorts catalogued by the English florists.

Mrs Loudon says, in her "Ladies' Flower Garden," that "the varieties of forms and colours which appear in the plants raised from seed are indeed so great that few floricultural pursuits can be more interesting than to sow a bed of Pansies, and watch when they flower, for the varieties desirable to perpetuate."

By judicious management, a successive bloom of Pansies can be retained for eight months in the year, and even a slight attention is liberally rewarded by a continued profusion of beautiful flowers. The Pansy never blossoms so well as when the plant is small and well rooted; for as it increases in size, the bloom, though more abundant, is smaller, and in other respects inferior. The great art, then, in growing these pets of both practical and amateur florists, is to keep up a constant succession of flowering plants during the spring, summer, and autumnal months; and these plants should be young and vigorous. This is done more easily by cuttings than by seedlings. They can be grown more rapidly, and are more sure to produce beautiful flowers. The cuttings should be about 3 inches long, taken from the points of the shoots, and cut off immediately below a joint. The north side of a low fence is a good situation to strike the cuttings. The soil should be stirred up and broken fine and smooth, and a layer of fine compost, 4 inches in depth, placed upon it, and over all, a covering of fine white sand, pressed down firmly with the flat of the rake. The cuttings are prepared, by stripping off the lower leaves, so as to allow less surface for evaporation, and are to be inserted in rows, 3 inches apart on each side. It is very needful that the end of each cutting should be firmly planted in the soil, pressing it closely round the stem with the fingers. A gentle watering should then be given, and if hand-glasses, or even common tumblers, can be procured, they will hasten the growth of the plant. In about six weeks they will be well-rooted, and fit to transplant into the flowering-beds, or into pots for "window gardening." No plant is better adapted for this purpose, as they are not so liable to the attack of insects, as are more delicate plants, and their bright faces are very attractive in the dark wintry days. A few pots of cuttings must be secured for that purpose.

Pansies are frequently layered by pegging down the young shoots, and covering them, all but the extreme points, with fine mould. An incision may be made at the joint, as is done in layering the Carnation, but they will make roots equally as well without using the knife. When rooted, they should be separated from the old plant and potted. They may be also multiplied by dividing the roots. These divisions, planted in shady borders, soon make fine plants. It is very important to select a cloudy or rainy day for removing and transplanting Pansies.

If the amateur uses seed grown by himself, great care must be taken to save it of the

inest quality. When any particularly fine flower is observed, it should be tied up for seed, and no other bud permitted to remain upon the plant, thus throwing all its vigour into one seed-pod. In this way very superior seedlings can be raised. The seed can be sown as soon as ripened, or in spring, summer, or autumn—in the two former seasons it may be sown broadcast in the ground. When the seedlings flower, those that are not worth retaining should be uprooted, and the best transplanted into prepared beds, where they should be planted 18 inches apart every way. The soil must be exceedingly rich to produce large blossoms. Old pasture-turf well rotted, one-third; leaf mould, one-third; and one-third thoroughly decayed barn-yard manure, will make the best compost. In this soil, Pansies thrive freely. The situation should be on the north-west side of the house, shaded from noonday heat, for they delight in moist, shady places, and are very rank feeders, copious waterings of liquid manure being beneficial.—*A.*

CARNATIONS AND PICOTEES.

ALL the varieties of Dianthus are especially interesting, not only for exquisite perfume, but also for the great beauty of their individual flowers. First and foremost of the whole genus, Carnations and Picotees claim our attention. It is difficult to come to any conclusion, which of the two is the more beautiful—the Carnation with its pure white ground, flaked and bizarred with numerous colours, or the Picotee, with its narrow margin of scarlet or purple, more chaste and delicate than would be possible for the imagination to pourtray.

No flowers are more acceptable in the lady's boudoir or in the bouquet; and the tree varieties flowering only in the winter and spring months, are eagerly sought after.

To cultivate them successfully, they require pure air, and they succeed much better in the country than in the neighbourhood of large towns. Although they can be grown with some success in the vicinity of the latter, the blooms are not so fine; and if hot weather set in when they are in blossom, the majority of the flowers are shrivelled up through the moisture being so quickly evaporated. In the country especially, where the soil is somewhat retentive, and the air cold and refreshing, they luxuriate.

To the amateur cultivator they are a source of great pleasure, as in addition to the interest felt in their rapid growth after refreshing showers in the spring, the development of the flowers is anxiously watched, and the cool and invigorating evening breeze is redolent with their fragrance. Those who are making their first attempt at their cultivation, and require only flowers for the decoration of the garden and bouquets, would do well to begin with trying their skill with seedlings; a packet can be bought of any respectable seedsman for four or five shillings, containing, ostensibly, twelve varieties; there will, however, be most likely a hundred varieties, as the seedlings will sport very much from the parent type. The imported seed will be preferable for beginners; it will give very good flowers, but not equal to named choice varieties, but sufficiently good for the purpose intended.

No time should be lost in sowing the seed; the first week in July is somewhat late, but if sown at once they will blossom next spring. The precaution must be taken to sow each kind separately in a "4-inch" pot, carefully labelling the same. The soil should be nice turfy loam, with some silver sand mixed with it—strong soil is preferable to light. Place the pots, if possible, in a slight hot-bed, failing this under a hand-light or one of Rendle's Protectors, throwing some shading material over it, to protect the

seeds from the scorching mid-day and afternoon sun. As soon as the young plants appear above the soil, give air day and night, gradually increasing it as they progress. As soon as the plants are 3 inches high, pot each one off singly into ". 4-inch" pots, and place them in an open and exposed situation where they get plenty of light and air; protect from the sun for a day or two after potting off. The only attention they will require will be watering and destroying insects, looking out especially for a green maggot that is often very troublesome in the autumn months. By the middle or end of September, they should be moved to their winter quarters; this will be either an ordinary frame or Rendle's Protector. Whichever it may be, take care that ample means are allowed for ventilation on every fine day, and also have the lights or glass raised to a sharp angle, that all wet and damp may be thrown off, as during the winter months the soil should be kept dry, giving only sufficient water to prevent the leaves shrivelling. Cover with mats, or some such protection, in frosty weather, and a good layer of coal ashes should be placed under the pots.

This treatment will carry us on until April, remembering to give plenty of air on every favourable occasion. About the middle or end of April, depending upon the state of the weather—if severe frost, defer until the early part of May—have the piece of ground or bed in which they are to be planted trenched 2 feet deep, and well pulverized with the steel fork, mixing some well-decomposed manure with the soil. When planting, let there be 15 inches each way from plant to plant, and as the plants grow, occasionally stir the surface with the Dutch hoe or steel fork. By the end of May or beginning of June, they will begin to throw up their flower stems. Pinch off all excepting four or five of the strongest, and tie each shoot neatly and carefully to separate sticks—standing about 20 inches from the surface of the soil. These sticks should be painted green, or they will look conspicuous and untidy. As the blossom buds swell, reduce them to four or five on each shoot. When the buds are full-sized and begin to expand, if care be not taken, they will split open the entire depth of the green calyx; and all the petals falling through the opening thus made, present anything but the charming appearance one has been led to expect. To obviate this, cultivators tie a piece of matting or worsted somewhat tightly (but not too tight) round the middle of the pod or bud. Looking at the top of the calyx, you will find it divided into six or seven parts; split the calyx down very carefully in continuation of these divisions, so that they may be all uniform to the tie round the centre of the pod, and you will be rewarded by having a handsome flower. Practice and attention will soon enable you to overcome any little difficulties.

Abont the middle of July, a top-dressing of well-decomposed manure should be placed over the whole surface of the bed or border, covering the manure with a slight quantity of soil; and if the weather continues dry give copious waterings twice a-week with weak manure water.

There will be, no doubt, amongst them some varieties one would like to perpetuate. The best way to accomplish this will be by what is termed layering, selecting some of the longest shoots, thinning out any small weakly ones. Trim off, with a sharp knife, the leaves to within four or five joints of the top, and cut half way through the shoot at the fourth or fifth joint, beginning the cut ½-inch from the joint, at the side nearest the parent stem, and continuing through the joint for ½ inch or so towards the top, making the cut at the upper side of the shoot; slightly press the shoot on one side so as to expose the incision sufficiently to prevent its uniting again; peg it down firmly, and sprinkle a little silver sand over and around the incision, and cover up with 1 inch or so of soil. When the shoots are all "laid" (as the term is) bank up the soil all around the side 1 inch or 2 higher than the soil around the parent plant, and this will enable you to water or sprinkle the layers should dry weather continue. There can be no fixed time for this operation; a tolerably safe guide, however, is when the

second or third flower is expanded on: and after this period no time should be lost in layering.

If at all doubtful of your ability to understand the information given above, enlist the sympathy of some old hand, who will only be too happy to impart the information.

Early in September, the layers should be examined, and if found sufficiently rooted, cut through the remainder of the stem, where the incision was first made, give a good watering, and allow the young layers to remain a week or so after severance from the parent plant, and then pot into 4-inch pots, and treat as advised for the seedlings you require.

In the next number, I shall enter into the cultivation of the named varieties which require to be grown in pots. When planted in the open ground they are very apt to run, *i.e.*, the white ground colour changes to a red or dirty purple, and they deteriorate in quality. Such as are intending to cultivate this class of flowers will do well to take notes of any varieties that come under their personal observation, or look into lists of varieties staged at the principal Exhibitions, and they will then be ready to start for next season, as the young plants will not be obtainable until first week in October.—*William Heale, Victoria and Paradise Nurseries, Upper Holloway, London.*

FLOWER CULTURE IN THE OPEN AIR.

FEEDING OF PLANTS.

THERE are two general modes of supplying plants with food. One may be termed the wholesale, and the other the retail. By the one method, enough is given at once to last for a season or more; by the other the food is provided piecemeal, a little at a time, as it is consumed. The former method is called manuring, the latter top-dressing, and there are many ways and a variety of agencies employed in doing either or both. For instance, Nature manures and top-dresses as well as man, and all dead matter, liquid, solid, gaseous, is fit food for plants. Singularly enough, many people fancy that flowers need little or no food. They give them none, and are constantly stealing away from them all that was provided for their strengthening and enlargement by natural means. Thieving weeds are allowed to prowl about the flower larder, the strong roots to oppress and push out the weak, from the best and richest food. All decomposing vegetable substances are removed bodily by hungry rakes, or sharp-set fingers, and having done all possible to deprive the flowers of food, people affect to wonder greatly that the plants refuse to grow strong. How can they? True, they have marvellous powers, but the creation of something—much out of nothing—is not of them. Plants cannot grow without food any more than ourselves. And we do not expect it of other plants, only of the flowers. All agree to feed their Cabbages, their Onions, Potatoes, Wheat, and Mangold. But Roses, Mignonette, Pelargoniums, Verbenas, Stocks—they are too sweet to eat, and as for manure—faugh!—it would stain their purity, mar their delicate daintiness. This reminds us of a rustic beauty who thought herself too lovely to eat. But hunger soon broke through that phantasy, and she longed for a thick piece of bread and butter more than to see her own sweet face in the glass. It would be well if some of our flower-growing starvers could be made to change places for a time with the hungry plants. It would cure them of starving notions for all future time. It takes just as much food to grow the most beautiful flower as the largest Cauliflower—possibly more. Perhaps the beauty makes a special drain on the resources or strength of the plant. True, the colour, and the pencils that lay it

on, are of the sun, but the canvas is provided of the strength of the plant. No; flowers are free livers. They empty the rich filled larder of the earth with as much or more despatch than fruits or vegetables. Hence, if they are to grow fat and strong, and to continue growing, the importance of starting with a large larder well filled. But both size and furnishing are but too often neglected for the flowers; or, in other words, little care is taken to make the ground for them either deep or rich. The earth itself is a great storehouse of plant food: the larger the available area provided for the roots, the longer of being exhausted. This is now generally understood in the cultivation of fruit and vegetables, but too often ignored in the culture of flowers. Many are careful to provide a tilth, 4 feet deep, for Cabbages, that will allow flowers to starve, or pick up a scanty sustenance, on a root run of 4 inches. Is it any wonder that these plants starve in consequence? The food of the earth is quickly exhausted, and growth necessarily arrested. But the earth is too often poor, as well as shallow. There is little of it, and that little is less worth. A tilth, from 2 to 3 feet deep, ought to be prepared for flower culture—and this root run should be thoroughly furnished with suitable manure. By suitable, I mean partially decomposed, and what gardeners call sweet dung. A compost formed of one-half farm-yard manure, and one-half turfy maiden loam, free of weeds, laid up together for twelve months to mellow and sweeten, and turned over three or four times during that period, is the very best food for flowers: this applied at the rate of 50 tons per acre, will grow almost any garden flowers to perfection. Only a few flowers, such as Roses, like, or at least can appreciate their food in a fresh state. These can convert night-soil, or rank pig manure, into the sweetest cups of immense substance, and Grecian models of form. It seems impossible to over-feed Roses. They are the Kohl rabis (hear, hear) of floriculture; drawing in nourishing juices from all quarters, the richer the better they seem to like it, and always calling for more. But such rank food would ruin most flowers—make them to overgrow their beauty, with rank wood and foliage. Partially decomposed food, on the contrary, imparts strength without grossness, and develops to the full the size, substance, and sweetness of the flowers. Sufficient earth properly stored with the right food is the foundation of success in flower culture.

But supposing, as is often the case, the foundation has been badly laid, is there any other method of helping the flower? There is. Top-dressings add to, improve, enrich, strengthen, without radically renewing the substance or increasing the depth of the ground. The earth can be filled with good things, the flowers feed from above in several ways. Fresh earth of better quality may be laid over the roots. This is the simplest mode of top-dressing. It adds to the depth of the ground, and thus enlarges the size of the larder. And again, manures or composts may be employed instead of mere earth. These feed the roots, enrich the whole area of the soil, and husband its moisture at one and the same time. More food may also be given in the shape of artificial manures, and sprinklings of concentrated meats doled out by measure, in nice accordance with the consuming power of the plants. Concentrated foods are not in safe eating condition. They must be first broken down for use, diluted by the solvent powers of water or disintegrating effects of earth and air. But the most speedy mode of providing food by top-dressing is to apply the latter in the form of rich soups and nourishing broths. Solids may be purposely dissolved in water, as the strength of beef is fused into beef-tea, and poured in solution over and through the whole mass of the roots, and the absorbent surface soil which they have exhausted. It will be strange, indeed, if the roots, and the earth they inhabit, are not abundantly filled with good things, as the nourishing stream passes by; and the fact is well established by the success of the practice that the flowers feed abundantly on liquid manures. Then, in top-dressing, there are several obvious advantages in this mode of applying food. The fluid carries it to where

it is needed, and presents it to the hungry roots in such form as they can readily eat it up. Besides, quantities of this food are prepared for us without trouble or expense. All liquid excrements, all water contaminated with filth, is so much top-dressing of the better sort ready to our hand. We have only to apply it. It is plant food of the best description, prepared for this express purpose, and there is no other natural nor legitimate outlet for it. Enrich and beautify our flowers, enlarge our fruits, increase the produce of the earth with it—and a blesssing is in it. Waste it —and it becomes a curse. Were our flowers all plentifully fed; the land they live in copiously enriched with liquid top-dressings, the great sewage problem would be solved at its source. The mansion, the villa, or the cottage, would utilize its own waste, and the plague of weakness, disease, and death, borne by every reeking stream of sewage, would be stayed, the stream itself would be dried up; or rather, it would never be formed to anything like its present extent. A good deal of our present river pollution flows from country villages and our farm-houses.

When the great problem of town drainage shall be solved, it will be no longer tolerated that our rivers shall be poisoned through tributary streams, and the land on their banks, impoverished by this reckless waste of top-dressings for flowers and corn alike. Were these more abundantly fed by liquid top-dressings, our health and strength would be more firmly established, and the flowers would blossom in richer profusion, greater beauty, and fuller fragrance.—*D. T. Fish, F.R.H.S.*

AMARYLLIS CULTURE.

HAVING profited by the advice I received from a practical, although amateur florist, whose counsel I sought as to how to make my varieties of Amaryllis flower in pots, I send the information to you, in hope it may be of service to some thousands of readers. The varieties I had were A. formossissima, A. vittata, A. Belladonna, A. grandiflora, and A. lutea. My counsellor replied:—"The Amaryllis is not a very satisfactory class of bulbs for house culture, as they require a high temperature when at rest, and a cool one while growing. The A. formossissima (which is really not a true Amaryllis, but a Sprekelia) is one of the free bloomers, and therefore one of the most popular sorts. The plants should be planted in a light, rich soil, and while growing give plenty of water; but as soon as the leaves shew signs of fading, withhold the water, but do it gradually, until the plants go to rest, and in this condition leave them two or three months, keeping the bulbs in a warm dry place. Whenever it becomes desirable to bring the bulbs into bloom, commence giving water; a little every two or three days at first, increasing the quantity as the stems appear. If no flower stems appear, but leaves instead, treat in the same manner as before, and dry off the bulbs in the course of two or three months, and repeat the operation until flowers do appear. Some of the species persist for a long time in remaining barren of flowers; but with an equal persistency on the part of the grower, they will finally yield to proper culture and treatment. Trusting that all who follow this plan will be as successful as myself, I shall be glad if any of your readers can tell me how to make a Ficus elastica (India-rubber plant) grow. I bought one two years ago, but although quite healthy it makes no progress.—*Helen S.*

TO HYBRIDIZE FLOWERS.

IN writing articles upon Horticulture, we constantly use the terms "hybrids" and "hybridization." To many of our readers they convey no idea whatever; we will therefore explain the process.

It consists in cross-breeding one flower with another. It is only plants of the same family, that is, of the same genus of its different species, that will inter-breed with each other. This general law of Nature has been the test by which the gardener has frequently corrected the erroneous classification of the botanist. The selection of the parent plants for a cross requires some little taste and judgment; the amateur will learn by experience that the flowers selected should be as dissimilar as possible, and the female or seed-bearing plant should be chosen for its beauty of form, and the male for its brilliancy and distinctness of colour; and those which have the most prominent anthers should be selected. Divested of technicalities, the operation is exceedingly easy and simple.

Take a flower of a Gladiolus to commence with, as its stamens and anthers are so prominent. In its centre you will see a column termed the *style*, which expands on the top into three hollow and somewhat grooved fleshy-like substances, termed the *stigmas*. At the base of the style is the ovarium, or seed vessel; the style, stigmas, and ovarium form the *pistil*, or female organs of the plant. Surrounding the pistil you will find three upright bodies, termed *anthers*, each supported by a thread-like substance termed a *filament;* these filaments and anthers constitute the *stamens*, or male organs. With a flower in your hand, these explanations will be understood at a glance.

The flower from which it is intended to procure the hybridized seed should, as soon as it blossoms, be covered with a piece of very thin muslin or gauze, to prevent the entrance of bees or insects, for it is by their agency that the fertilizing process takes place. The flower must be watched closely, and before the anthers burst they must be carefully cut away. The other flower, the male parent of the cross, must also be watched, and as soon as its anthers have burst, and are covered with the flowery looking substance termed *pollen*, they must be cut off and placed on a saucer or plate, and kept until they are needed. Daily attention must then be paid to the stigmas of the female plant, and as soon as they appear to spread a little and become moist at the point, the pollen must be applied to them with a fine camel-hair pencil. After this process, termed *impregnation*, the muslin must still be kept closely tied over the flower until it fades. The pollen once gathered will retain its fertilizing power for some months; but the moisture on the stigma continues only a few days, and must be taken advantage of as soon as it appears.

The hybridized flower should be carefully tied up, all the other flowers from the stalk being removed, and the seed, when ripened, should be labelled with its parents' names.

We take the Gladiolus as an example, because with it the process can be so easily understood; but many other flowers can be hybridized. All our rarest Roses are the result of the careful manipulations of the florist—also the perfectly double Zinnias; the Camellia and rose-flower Balsams, and all the Tom Thumb varieties of flowers have been produced by means of hybridization.

We hope our readers will be tempted to try the process upon their pet flowers. The Pansies of the day are the result of this art, and it can be carried to a limitless extent.

GARDEN PLOTS.

WE have made great progress during the past few years in our style of gardening. Formerly, every little garden plot, however small, was cut up into a labyrinth of narrow walks, carefully edged with dwarf Box. This sort of needless and unsightly patchwork is fast passing away, and a far better taste is being shewn in the smooth, soft carpets of green grass, with the needful flower beds laid out wherever required. Flowers are like diamonds—their settings should be of the inconspicuous order, and never the most prominent feature of the two—as often seen among the "shoddyites" in both fashionable society and horticulture. Our florists and nurserymen still have a considerable demand for "Box," for edgings; and it is a pity, although 'tis true, that we have so much bad taste shewn in our gardens by its use.

Sometimes the ground is cut up into walks resembling an old-fashioned patch work bed-quilt of many colours, and the proprietor, not wishing to be outdone in the way of variety, crowds a thousand species and varieties of plants into a space where a hundred would be a far better number, and shew to better advantage. This trying to see how many varieties can be grown, has been a curse to pomology, and is rapidly ruining floriculture. A dozen plants well grown, shew better taste and judgment than a hundred as far too generally seen.

I hope your readers will remember this when making their selections of seeds and plants. Choose only a few of the very best, and of species that will give a succession of bloom throughout the season, and bestow upon these all the care that would have been given to many, and see if greater satisfaction and better results will not be derived therefrom.

I know an individual who cultivated three hundred varieties of Gladioli last summer; but one-tenth of the number, properly selected, would have furnished all the beauty and other merits found in the entire lot. To strive for the very best is commendable; but to seek to obtain everything is like trying to gain an education by studying everything, and knowing nothing thoroughly.—*Z*

ORNAMENTAL GRASSES.

PLANTS with light, graceful foliage are every year becoming more popular. The beautiful, feather-like fronds of our hardy Ferns would add considerably to the charms of many a garden where such common, but valuable plants are seldom or never seen. But to complete a picture of the highest order, we need a greater variety of colours, and even lighter touches, and more graceful pencillings, than are furnished by the numerous species of Ferns; we are therefore compelled to copy Nature, and bring in the grasses as the finishing strokes to our canvas.

A smooth, well-kept lawn is the ground-work of a beautiful garden, and when the taller-growing species of grasses are planted, here and there, either in groups or interspersed among ornamental shrubs and other flowering plants, they become objects which attract almost universal admiration. Their plumes may not put on the bright colour of the scarlet Sage or purple Coleus, but the silvery shades and rosy tints which they do assume in autumn, add lustre to their more brilliant companions.

The ornamental grasses have her

received less attention than they deserve, and our gardens are far less beautiful in autumn than they would be if these plants were more extensively used. There are a large number of desirable species, and their cost is but a trifle, as seeds of most kinds can be obtained of any of our large seedsmen, and by giving proper care, plants may be procured in almost any quantity desired. On account of their permanency we prefer the perennial sorts, although there are many annual and biennial species worthy of cultivation, even in the smallest collection. The following are among the very best of the perennial species, and should be procured by every one who may wish to indulge in this class of plants.

ANDROPOGON ARGENTEUM.

A new, rather slender growing species, with silvery coloured leaves and plume. It is quite hardy, grows about 4 feet high, and is readily propagated by seeds or divisions of the roots.

ARUNDO DONAX.

This is a very large, coarse-growing species, forming large clumps. In ordinary garden soil, the stems will grow 10 or 12 feet high. The flower spikes are very large and handsome, but they issue so late in the season that frost generally destroys them before maturity. The Arundo versicolor, a striped-leaved variety of the above, is far more desirable than the species, but it is not quite hardy, and requires a little protection in winter.

CHLOROPSIS BLANCHARDIANA,

a new and beautiful grass, growing about 6 feet high, not fully tested, but promising to be an acquisition.

ERIANTHUS RAVENNÆ,

one of the most desirable species in cultivation. It is quite hardy, notwithstanding the cold of winter, without protection; forming large clumps from which the stems rise to the height of 5 or 6 feet, and crowned with silvery plumes, and 10 inches in length. A clump of this beautiful grass, with its numerous tall, waving plumes, bending with every breeze, is an object worthy of a place in the Garden of Eden. A variety, with violet-tinted plumes, is also equally desirable. It is known as Erianthus Ravennæ violascens.

GYNERIUM ARGENTEUM—PAMPAS GRASS.

This is truly the "queen of ornamental grasses." Words, however skilfully used, fail to give anything like an idea of its beauties. It must be seen to be appreciated. It forms large clumps like the Erianthus, from which spring the tall stems, each terminated with a plume 2 feet in length, of the purest glistening silvery white. It is tender in the north, but may be protected, although it is far the best plan to lift the roots in autumn, and place them in a large tub or box, and store in a cellar during winter. Several new varieties have been produced in the last few years, seeds of which can now be obtained.

PHRAGMITES COMMUNIS.

Although this is one of the common reeds, growing along the banks of our rivers, it is a beautiful grass and worthy of a place among its more aristocratic companions. It grows 6 to 10 feet high, and in autumn the spikelets are beset with long, silky hairs, which give it a beautiful appearance.

STIPA PENNATA,

the "feather grass," as it is usually called, is too well known to require more than a brief notice here, but it should not be overlooked in making a selection of this class of plants.

Those who may desire a greater variety, should add *Dactylis cæspitosa*, *Tricholæn Teneriffæ*, *Tripsacum dactyloides*, and *Uniola latifolia*.

Work in the Garden during August.

From "THE VILLA GARDENER."

THE VINERY.

AINTAIN a genial growing atmosphere of 65 to 70 deg. minimum, rising 10 or 20 deg. un heat, from five to seven in the afternoon. As however, as the grapes begin to change colour, ı little air, an inch or two at night, on each top- according to the state of the weather. Moving d a low night temperature are the best recipes for ; colour on Grapes. But it must not be over- d that Grapes continue to swell until the colouring rly completed. The vapour bath and high tem- ıre recommended for the afternoon treatment, the swelling of the berries. The low night rature, and ventilation with it, helps the colour- Thus the two processes proceed simultaneously, uality is best brought out by this mixed treat-

Grapes may be starved into colouring at the se of quality. They may also be forced out of y, and hindered from colouring by excessive ation. Hence the importance of a middle ; or rather two different courses in succession— growing regimen in the day time, culminating ush forward from five to seven, and then a cool ı till eight or nine o'clock next morning. her the plan of air all night is adopted or not, arly ventilation in the morning is indispensable. un cannot raise the temperature a single degree ı a close vinery, without injury to the colour of uit, and, singular as it may appear to the ur, the same care is needed to colour white s perfectly as black. This may seem an Hiber- way of putting it, but it is not. No two white s are of the same colour ; some are golden, some wn, others different shades of green or white. when perfect has its own shade, and it needs r the same care and the same treatment to develop ıs the special hues of dark or purple colours that uish the so-called black varieties. No other requires so much skill to colour thoroughly Muscat. When of a clear, amber golden shade, ly its colour, but its quality is assuredly perfect. : Grapes approach maturity, less water must be ı the atmosphere. But with abundance of air, ıring bright weather, there is little fear of an of water in the air of vineries, whereas anything ching aridity in the air is apt to bring red and thrip with it. The latter seldom appears where Vines have been sadly mismanaged, or s or other plants have been placed in vineries. Heavy fumigation with tobacco is the only effectual remedy for this. But it is always unfortunate to have to apply tobacco smoke to Grapes, and especially so when they are approaching maturity. No thrip-infected plant should ever enter a vinery, and managed as directed here, thrip will not come to Vines unless it is carried thither. The red spider is widely different. It enters at times the best regulated vineries. As soon as seen, paint the pipes with a mixture of equal parts sulphur and lime, and apply a brisk fire until the fumes are so strong as to hit disagreeably the apple of your eye when you enter the house. This will do for the spider. Many have doubted the sulphur cure, because it has really never been brought to bear upon the pest. True, they may have painted the pipes, but forgot to warm them, or left the house open while the fumes were being distributed by the heat, or neglected to apply sufficient heat to vapourize the destructive strength of the sulphur. This is like expecting artillery to breach a citadel when out of range, or without the means of firing off its charge. Remove all superfluous growth, and tie the large leaves down from abutting against the glass. See also that the leaves veil the upper side of the bunches from the sun. Neither quality nor colour is imparted by allowing the sun directly to hit the upper surface of the berries.

THE ORCHARD HOUSE.

Watering, syringing, ventilation, and general treatment of trees may proceed the same as during last month. Should the weather, however, become cloudy or cold, it will be necessary to leave off syringing Peaches and Nectarines. An excess of moisture, with a depression of temperature, are the most fruitful sources of mildew. This appears in white, mealy-looking spots on the fruit. The best, and indeed the only specific is an instant dusting with dry sulphur on the affected parts, and also over the leaves where the mildew often originates, spreading from thence on to the fruit. A dry air will help the sulphur to effect a cure. See, too, that the roots are neither too wet nor too dry, as either extreme tends to produce mildew. The popular idea is, that it proceeds chiefly from an excess of moisture at the roots. But the want of a sufficiency of water is an equally fruitful cause of this troublesome pest of Fungus. As the frui nears maturity, the use of manure water should be gradually withdrawn. Less manure is needed, if,

indeed, any should be used during the last stages of ripening. And it is pleasanter to those who eat the fruit, as well as better, possibly, for its flavour, to use clean water only, for a fortnight or three weeks before it is gathered. If the trees are weak, they may be fed with manure water again as soon as the fruit is harvested. Where too many trees promise to ripen at one time, several of them might be removed out-of-doors, and placed behind cold north walls, or in other shady places, to retard and prolong the succession of ripe fruit. Growing trees may still be pinched in, or back to three or four leaves. Many of the trees would do better outside after the fruit is gathered. This would give more space to the latter varieties. If the orchard house is kept partially shaded during the heat of the day, and abundance of thorough ventilation given night and day, Peaches, Nectarines, and Plums, may be kept later in orchard houses, than on walls. The fruit will also be much finer and of better quality. Many of our finest stone fruit on south and west walls are much injured by excessive heat. It escapes parboiling in orchard houses, and hence its superior excellency.

THE GLASS HOUSE.

Azaleas and Camellias may still be shifted into larger pots, using either turfy loam or turfy peat, but not the two mixed, with about one-sixth part sharp silver sand. Keep the leaves frequently sprinkled, and the plants in a shady part of the house, until they have finished their growth, or the flower buds are formed for another season. Then remove them to a shady situation out-of-doors. See that the plants are placed on a worm-proof bottom. All seed should be picked off Azaleas, as it weakens them to ripen it; and the dead flowers picked off Heaths as soon as they fade. Prune back straggling shoots and mould the plants with uniformity at the same time. When they fairly break again into growth—that is, when the young shoots have grown an inch, or more—shift any plants that are growing and rooting freely into larger pots using hard gritty peat to grow them in. Pot as firmly as finger and thumb, and the aid of a handy wedge-shaped stick about 6 inches or 1 foot long, will enable you to do, and put the plants out in a sheltered place, shaded for a few hours from the noontide sun. No plants need so much drainage as Heaths. Stagnant water at their roots is death to them. The want of sufficient drainage, the employment of loose spongy peat, and careless watering, are the chief causes of the high mortality among Heaths and other hard-wooded plants in the hands of amateurs.

Pelargoniums.—The show and fancy sorts will now be nearly out of flower. Remove and place in a sunny place out-of-doors to ripen their wood. Do not push the process too fast by withholding water. This will dry up but not ripen them. Water liberally, and let the wood become brown and harden gradually. When well ripened, the plants may be cut down to within two or three leaves of last year's wood. Leave the plants in the same position till the dormant buds break afresh, and put in as many cuttings as may be necessary.

Zonal, Variegated, and Bronze Pelargoniums.—Encourage with liquid manure water, stake, and train. Pick off all flowers as soon as they fade. Many of the finest-leaved sorts are most effective for decorative purposes without flowers. Pick every flower bud of such as soon as seen. Ivy-leaved varieties in hanging baskets, water freely, and encourage to grow and flower throughout the season. These are among the most effective plants for roofs, windows, or brackets.

Fuchsias—Are admirably adapted for similar positions. Many amateurs attempt to grow their Fuchsias too large or too formal. They seldom look so well as loosely grown in baskets with the shoot dropping down in graceful pendants of elegant leaves and flowers. Three other modes of training Fuchsias are very common. The umbrella form for clean stemmed standards of various heights; the pyramid of different styles, very slender and very fat, being the two extremes, and the bush or many-stemmed form. The form is very much a matter of taste and space. But the size of the flowers will be improved by rich feeding with manure water, and top-dressings of spent cow dung. Staking and tying will likewise need attention. All formality must be avoided. At this season, Balsams, Cockscombs, Celosias, Humea elegans, and such plants, need plenty of food and water.

A good many, and some villa gardeners among them, sub-tropicalize, as it is called, their glass house in summer. Even Fuchsias, Pelargoniums, Balsams, &c., are turned out-of-doors, and the house is gracefully filled with Aloes, Paper Plants, Bamboos, Caladiums, Echeverias, India Rubber, Cannas, Solanums, Wigandias, Yuccas; and such Palms as Chamaærops excelsa, Phœnix dactylifera, Seaforthia elegans; and Ferns, as Woodwardias, Dicksonias, Cyatheas, Cibotium, Alsophila, Davallia, Asplenium, and Adiantum. These, with some of the hardier Lycopods, such as L. denticulata, and L. variegata, argentea, apoda, pubescens, Formosa, and Danielsii, form such an assenblage of greens, and fine or exceptionally choice foliage plants, such as can hardly be matched in the finest so-called sub-tropical gardening out-of-doors.

Keep climbers on the roof thin, clean, and neatly trained, avoiding the two extremes of stiffness and tangled confusion. It is hardly possible to keep the glass house too cool in August. Shade all plants in bloom, and choice Ferns and other green leaves, from the mid-day sun. Water copiously, sprinkling sub-tropical plants frequently overhead, and allow neither dirt, nor insect, nor dead leaf to be seen on plant, shelf, roof, floor, or path. Let everything in and about the glasshouse declare to all comers that it is sacred to cleanliness, devoted to the enjoyment of the beautiful.

PITS AND FRAMES.

Hot Pits.—Water Cucumbers copiously, root and branch, overhead about twice a-week; sprinkle the leaves every afternoon about 4.30, and shut down the lights close, to create a genial atmosphere and promote rapid growth. Unless a Cucumber is grown by express, it is good for nothing to eat. Quick production means sweet crisp eating. Remove old exhausted leaves, cut the fruit in a young state, stop each shoot at every fresh leaf formed, and beware of over-cropping. Plants that have borne long and well may shew signals of distress. Cut them in more than usual, remove nearly all the fruit, and top-dress with loam and well rotted manure, about equal parts, applying it, say, 4 or 6 inches thick. The plants will root up into this at once, and quickly renew their growth and strength.

Melons.—Water with care, giving little or none towards the finishing of the fruit. Keep successional crops stopped; thin out the leaves and the shoots; beware of overcrowding and of overcropping. Six good fruit to a light is a heavy crop. An excess of fruit on any one plant, means small and comparatively worthless fruit. Afternoon sprinklings are a good antidote to red spider. Should it, however, appear, as is probable, during the ripening of the fruit, dust the leaves and branches and the earth over with dry sulphur, and paint the back of the pit or frame, where the sun hits it, with sulphur paint. To liberate the former, or vaporize the sulphur, shut the pit or frame closely for an hour or two, with the sun beating fully upon it, and then cover it with mats, and keep it close for ten or twelve hours afterwards.

Balsams, Cockscombs, Celosias, Gloxinias, Achimenes, Begonias, Caladiums, and other semi-stove or heat-loving plants, treat similar to Cucumbers, until they are coming into flower. Then gradually expose to more air and a cooler temperature, to fit them for filling and adorning the living rooms, glass-house, or conservatory.

Cold Pits.—Cinerarias, double and single Chinese Primroses, herbaceous Calceolarias, shift into larger pots, and push on, to prepare for winter and spring flowering. Late flowering Pelargoniums and variegated varieties, water and grow with care under glass. Shade the choice variegated kinds from the sun for an hour or two in the middle of the day. Sow seed when ripe, pot off and grow on seedlings. Double or single Petunias, train and stake. Those grown in cold pits, make beautiful plants for the glass house in the autumn. Strike and pot off cuttings of Pelargoniums, Fuchsias, Salvias, Petunias, Roses, and sow a few pots of Mignonette for the earliest autumnal batch in pots.

THE FLOWER GARDEN.

The beauty of modern flower gardens may be said to culminate in August and September. Unless planted very thickly with large plants in blossom, they look somewhat raw in June, leafy in July, flooded with flower in August and September, slightly seedy in October, and paling into blanched-cheeked winter in November. Some would claim July as a month of full beauty, and so it is in many gardens; but in more I think my estimate will be found correct. This much none will dispute, that the garden should be in great beauty now, and it will need some attention to training, picking, pegging, staking, and it may be pruning, to keep it in the highest order. Strong growths may need restraint, weakly plants encouraging, and all keeping in their proper form and place, if order, which is a large element of the beautiful, is to prevail and dominate in the flower garden as it ought. In the mixed garden, there will be a good deal of work to be done. Dahlias, Hollyhocks, Phloxes, and other tall-growing plants to thin; to stake and to tie thin spring and summer sown Annuals; cut the seed off Polyanthuses and Auriculas, or divide and sow seeds of Carnations and Picotees. Lay Pinks, and put in pipings. Anemones, gather ripe seed, and sow Ten-week Stocks and Pansies soon. Keep the hoe stirring among the flowers; water Stocks, Asters, Marigolds, Zinnias, and other choice plants with manure water, and see that no weeds remain in bed or border.

Roses.—Continue to cut back all shoots as the flowers fade, and put in cuttings of Tea, Bourbon, Noisette, and Hybrid Perpetual Roses, in cold frames or under hand-lights. Prune Bankesian and other climbing Roses. Examine the ties of buds, loosen and re-tie. Secure the shoots of growing buds to prevent their being blown out bodily by the wind or rain. Top-dress Perpetual Roses with a sprinkling of guano, freely washed in with clean water or sewage. The Roses will reward you by blossoming freely right on into the winter months.

Mow all grass every week, sweep and roll gravel, clip grass verges every fortnight, and keep every portion of the flower department without spot, or weed, or dead leaf, or flower.

THE FRUIT GARDEN.

Protect fruits from the birds. Gather as it ripens. Thin out and tie in young wood, on Peach, Plum, Nectarine, and Morello Cherry trees. It is well to lay in as much young wood as possible, without overcrowding, choosing the young branches as near the base of last year's shoots as possible, and picking medium-sized healthy shoots rather than the very strongest. Of course, no weak, unhealthy, insect-punctured branches should ever be laid in if there are any healthy ones to be found. Breastwood on Cherries, Apples, Pears on walls or espaliers, or on conical trees, dwarf bushes, or cordons, should now be shortened back to four or six buds if not already done. Gooseberry and Currant bushes may be treated in the same manner, to permit the sun to plump up the buds at the base of the shoots into fruit buds for next season.

Raspberries.—Cut out the fruiting canes, and

thin the young shoots to four or six to each stool, tying them up to prevent their being broken.

Strawberries.—Layer and remove, and pot up or plant out runners for forcing or new plantations. Remove all the runners from plants intended to bear another crop, and top-dress them with 4 or 6 inches thick of rich juicy manure.

If the weather proves dry, the size and quality of all wall fruit will be much improved by a weekly soaking of sewage at the roots, and a daily washing overhead with clean water, from 5 to 7 P.M. While most effectually assisting the fruit, there is no better mode of promoting the health, and ensuring the cleanliness of the trees, than this daily shower-bath from garden engine or syringe in dry weather.

THE KITCHEN GARDEN.

Sow Cauliflower, Walcheren Brocoli, Cabbages, Coleworts, Red Dutch Cabbage, Radishes, Lettuces, Winter Spinach, Tripoli Onions, and Turnips, to stand through, or come in young during the winter. In sowing seeds at this season, choose light dry, rather than rich ground. All gross and rank growth must be prevented in crops intended to do battle with the cold.

Plant Walcheren and White Cape Brocoli, Winter Greens, Coleworts, Cauliflower, Lettuce, Endive Celery, and late Leeks, on all ground as it becomes vacant, by being cleared of such crops as Early Peas, Cauliflower, Potatoes, Lettuces, Kidney Beans, or other crops. Beans, Peas, Runner Beans, Celery, Ridge Cucumbers, Vegetable Marrows, Tomatoes, stake, train, gather, prune, water, earth up, &c., as they require these operations to be performed.

Harvest Eschallots and Garlic as they become ripe. Prepare Onions for harvesting by bending down, without breaking their heads. Use all the stiff-necked ones for immediate consumption—they are too juicy to keep well—and see that no ground is kept for more than one clear day without a crop, and that not a weed can be found within the kitchen garden. Weeds not only indicate slovenly keeping, but they represent a total waste of force, a misappropriation of ground space. It takes as much, or more, out of the earth to grow a weed as a Cauliflower. The latter nourishes, while the former simply impoverishes the earth, and it does nothing more or better. Talk of enacting stringent laws, forbidding by stringent penalties the shooting of the mischievous birds! It would be much better sense to enact that the grower of so many weeds in field or garden, should expiate his crime against society by a day's oakum picking, or bread-and-water fare for a week.

The Veterinarian.

BLOOD-LETTING.

MR D. E. SALMON, of Cornwall University, Ithaca, New York, thus states the *pros* and *cons* regarding that important subject of blood-letting, in the *Albany Country Gentleman*:—"The important position which blood-letting occupies as a therapeutic agent in the diseases of the domestic animals, the extent to which it is practised, and the vast amount of injury which is annually inflicted upon the stock of this country, by the unlimited use of an agent, the effects of which are very imperfectly understood by most people, have led me to decide upon this topic as the one likely to be more acceptable to stock-owners than any other. Consequently, I have written this article more for the general reader than for professional men, though I hope it will be found interesting by all.

Like antimony, blood-letting was long considered as a universal panacea, and it is impossible to say what it has not been used for, and just as impossible to give the original idea of its effects or mode of action. It has been restorted to in health and disease, to strengthen and debilitate; and, indeed, many persons at the present day bleed their animals whenever they shew any symptoms of ill health, without the least idea of the effect that will be produced.

For the last ten or fifteen years, bleeding has been very little practised by the medical profession; in fact, a member of the Medical Society of the county of New York (Dr Brown) stated, at a meeting last December, that during all his practice, some fifteen years, he had never seen venesection performed. The tendency towards bleeding, however, appears to be increasing in human practice; but this need not trouble veterinarians to bleed oftener, as they yet have a wide margin for restriction, with credit to their medical knowledge and advantage to their patients.

It must not be supposed, from what I have said that I intend to discountenance bleeding in all cases, and advocate its complete abolishment; on the contrary, I believe it cannot be dispensed with, without great loss to our curative resources. Let us, then, consider the exact effects which are produced by this agent.

Certain results can be brought about more speedily with it than by any other known means. This needs but little explanation: medicines must be first absorbed by the stomach or intestines, if given internally, or by the capillaries if administered hypodermically (under the skin). This of course takes time. By bleeding, the circulatory system is reached at once, and the effect follows immediately.

It decreases the blood-pressure force of the circulation, and the rapidity of the heart's action. By withdrawing a portion of the circulating fluid, the blood vessels are not so full—hence their pressure on the surrounding tissues is decreased, and the vascular tension being diminished, it follows that the force of the circulation must be weakened. The frequency as well as the force of the heart's action are also lessened, partly by a sympathetic action of the vaso-motor nerves, and partly mechanically, in consequence of the decreased quantity of blood in the circulatory system.

It weakens the system, and deteriorates the quality of the blood remaining in the vessels. The mere fact that the quantity of the vital fluid is decreased, is sufficient to prove that the system has been weakened; but when we come to consider that the remaining blood is impoverished, by having the proportion of its

most vital element diminished, it needs no demonstration to prove the result.

In the early stages of inflammation it has a tendency to prevent effusion and exudation, and to favour absorption. Our knowledge upon this point is not very decided; it is difficult to explain this action in any way, except mechanically. If the amount of blood in the system is diminished, it is very easy to believe that excretion, effusion, &c., would be diminished, and that the tendency would be to absorb fluids from the surounding tissues, until the circulatory system again contained its normal amount of liquid. But we cannot see by this explanation how any lasting beneficial results are to be obtained by this means, in fact, many good authorities contend that no good effects of the nature we are considering, do follow venesection; accordingly, we are obliged to consider this a doubtful point until further investigations have been made.

Local or topical blood-letting during the first stages of inflammation has a very beneficial effect in nearly all cases. This results from the direct removal of the stagnated blood, its replacement by that which is comparatively healthy, and the sympathetic action of the vaso-motor nerves, causing contraction of the vascular walls, thus aiding circulation, and decreasing the pressure upon the surrounding tissues.

We see many cases of pneumonitis, or inflammation of the lung tissue, in which the results of the inflammation prove to be an impediment to the circulation, and the consequence is an accumulation of blood in the right side of the heart, materially interfering with its action, and even threatening sudden death. Another case is where congestion of the vessels supplying the brain is likely to produce sudden death, by pressure upon the brain substance. Now, in such instances, we reduce by bleeding the amount of blood in the system, and consequently remove the cause which is likely to prove fatal, and then, by using proper means, we may guard against a recurrence of it.

Bleeding is also recommended by many in the first stages of inflammation in vital organs, to prevent the effusions and exudations which might be fatal, by interfering with the functions of those organs. In very many instances, these results will follow, however, even if bleeding be resorted to; though if the animal should happen to be in good condition, and evidently strong and robust, with a large amount of blood, bleeding will very probably be followed by good results if performed in the first stage of the disease. But if the patient be poor and thin, with no superfluous flesh, and only blood enough to sustain itself, we should never think of bleeding; the exhausted state of the system is what needs our attention, and should never be neglected, even though the brain, lungs, or heart, are in a state of inflammation.

The Dairy and Poultry-Yard.

MARKETING BUTTER.

'E learn from the Agricultural Returns last issued, that the number of in the United Kingdom was 157,000 r in 1870 than in 1869; 152,800 larger 1868; and that it exceeded by 504,000 1867. The actual number in England o was 3,757,134; in Wales, 604,749; otland, 1,041,434; and in Ireland, 352. This portion of a farmer's livestock l, fed, and looked after for profit solely; ofits on cattle are derived chiefly from onversion into beef, and the making of lk, of such as give milk, into cheese er. Overlooking for the present, their t in both beef and cheese, the owners cattle enumerated above, have ob- sufficient at stake to claim their atten- the best mode of marketing butter.

eneral terms, it may safely be said that s possibility there is of interfering with ndition of the butter from the time it the dairy till it reaches the larder, the for both producer and consumer. But attempting to say anything practical s subject, we must confess to a know- of manufacturing operations, performed very skilful hands, with a view at once rove inferior qualities, and to increase epers' profits. But while by these the last-named end is doubtless gained highest degree, the condition of the inferior sorts is, by such attempts at rements, made decidedly worse. The ner who pays for a mixture of butter, and dripping, coloured with annatto, led as full of water as it is possible, is ily wronged, provided he pays for it rket value of butter. But inasmuch y pound of such unpalatable mixture it ought rather to be styled inedible), that is foisted on an ignorant or careless public, operates in some degree as a check on the consumption of butter, and consequently interferes with agricultural progress, it is far more the farmer's than the consumer's business to see that the sale of such an article should be suppressed.

If we were considering the matter from either an ethical or an economic stand-point, we might leave it between the officers of health, the manufacturers, the vendors, and the public; but as it is simply in so far as it is an agricultural matter, we are at present concerned with it, we believe it is high time to say that to alter the condition of butter by re-dressing or re-packing is commercially culpable, whilst the introduction of any other substance, however innoxious, is fraudulent adulteration. To prevent both effectively, is to pack butter at the dairy, in the several quantities to suit the requirements of larger and smaller households. These packages ought only to be opened for examination as to quality; the butter would in such a way be fully protected from injury, and as it left the dairy, so it reaches the larder. Some purchasers buy 10 lb., others only 1 lb. weekly; each of these might be accommodated with an original package, nor would it be impracticable to provide for either larger or smaller buyers, including those who can buy ½ or ¼ lb. at any time, without greatly interfering with the generally good results of the proposed reform. The effect of such packages, in preserving the quality of butter, might be fairly estimated at 1d. per lb. on the second-rate sorts, and 2d. on the first-class kinds. The additional cost entailed for carrying it fully out need not exceed one-half, but never could come up to a like figure per lb. Obviously, every one is glad that within the past quarter of a century, the dressing of

butter by hand has gradually gone out of fashion; but this advantage loses half its value, so long as the vendors' wooden knives have to be applied behind a mysterious box, before the customers can be served with butter.

This evil and absurd custom must also be removed, and until it has ceased, butter, which is now a necessary portion of almost every meal, will be subjected to contamination.

The habit of sending butter on paper from the shop to the housekeeper, and not often clean paper, such as tea, sugar, and most grocery goods are wrapped in, but waste paper, either printed or written over, such as is used for soap, crystals of soda, and tallow candles, is a highly objectionable custom, and however strange it may seem at first sight, it is one of the penalties of which, in the form of lessening the taste for butter, the farmer at last has to pay. Doubtless there are many other modes of removing these and other hindrances still in the way of the farmer making the largest possible profit in butter, but whatever else may be done, so long as reform in the shape and size of packages is overlooked, the effects of the greatest efforts will be but little, if not wholly counteracted. The Dutch, Brittany, and other "brands" of foreign butter, all get into the great centres of consumption in these countries in a state better suited to leave the farmer the largest possible net proceeds, than does the Irish, or even the surplus supplies from British butter-makers. Any advantage foreign makers have over the farmers of the United Kingdom is owing to better packing solely. Besides the fear of a greater cost of packages, we anticipate a long list of objections to the reform we have suggested; but we believe that, like that of the expense of packing a given weight, most dreaded difficulties would be found, wholly imaginary, or if, in any sense real, easy of removal, without inflicting a loss on either consumer or maker.

The history of butter-making in the United Kingdom, from the earliest times, is one of gradual improvements, these being the natural outcome of many reforms. But the modes of packing, and the manner of making, seem to have gone hand in hand, so closely that no one could tell which preceded, or which followed as the necessary complement of the other. We have seen, on the Irish side of the channel, the system "packing" lead into that of farmers making up firkins, and selling them to jobbers. That not very enlightened mode of action ended, in turn, in the creation of shippers as a class. But now that the agency of this class is less appreciated than formerly, it seems requisite only to reform the packages up to the necessity of the class; and farmers who have butter to sell, in any part of Ireland, may get it into the hands of consumers in a fresh condition, and without having been tampered with, at a small cost of agency, in addition to that of transit. Nor is a like desideratum any less valuable as a means of bringing the surplus supplies of farmers in the various parts of England, Wales, and Scotland, to the best markets.

If butter were packed to suit such a mode of selling, it might, like fish, fruit, and other perishable commodities, be brought to auction and sold to the highest bidder, in the condition it left the dairy, whether that be saltless, mildly salted, or salted for keeping. If this custom were introduced, the agricultural interests would gain immensely, whilst any individual losses, which some of those in the trade might suffer, would be more than repaid to the class of which they are a portion. Farmers see now the folly of feeding cattle of bad or very middling breed on good pastures, and is it not equally necessary that good butter should be put into good packages, and sold unadulterated at its market value? Penny-wise and pound-foolish is a common error; and if we are right in concluding that every pound sterling lost by butter going to grease, amounting to an enormous sum annually, and falling wholly in some way on the farmers, might be saved by a reform in marketing, are we not also justified in saying that cost what the necessary packages for carrying out a reform may, such cost ought not to be allowed to stand in the way.

PROFITS OF CHEESE FACTORIES.

THE Committee of the Derbyshire Associated Dairies have just issued their first year's report, which, remembering the drawbacks and obstructions usually met with in attempting a new system of manufacture in any department of industry, is on the whole highly satisfactory. The Committee very properly do not generalize upon so short an experiment as that which has been tried in this country, as to the profitableness of the factory system of cheese-making, and they are the less inclined to do this owing to the exceptional character of the past season. That the contributors and supporters of the factory system have been satisfied with the results obtained, is fully borne out by the fact that they are all anxious to continue their connexion with the factory. There could be no better sign.

The Derbyshire milk contributors have received	£3547	1	5
The Longford.....	4580	4	9

Each contributor knows the amount of money he has received for his milk, and the number of his cows; a simple sum in division furnishes him with a ready and unerring profit-and-loss account on the working of his dairy, so that he does not continue his preference for the new over the old method in ignorance. The expenditure in necessary preliminaries and general organization has been large—the Committee, as in all undertakings, having many and great difficulties to contend with. The work had to be completed within a very limited period; not a single step could be taken until the arrival of the American manager, which was not until the 11th of March, and yet by the 7th of April one dairy was in full operation. Deducting, however, the cost of obtaining the American makers, £350, beyond the £200 paid by the two factories in their working expenses' account; the sum paid for interest on the amount required to pay the milk-suppliers before any sales of cheese had been effected, £112; the cost of printing and advertisements, £30; the secretary's salary, and sundry payments for insurance of cheese and rent of warehouse, &c., £90; and the deficiency in the working account of the Derby factory, £88; leaving about £960 expended in the plant and fitting up the two dairies, which remain the property of the guarantors, and at their disposal at the end of the three years stipulated for the trial.

The report continues:—"In estimating results of this first season's experiment, your Committee would remind you that the originators of this movement never anticipated being able to benefit, in a pecuniary point of view, first-class makers, and those obtaining high prices for their produce; although as regards both home comfort and family advantages, your Committee have good reason to know that these are no inconsiderable gainers. The chief hope and aim of the promoters of this system was to pull up inferior makers, and those obtaining low prices, to a more remunerative standard of make; and they feel that in districts producing inferior qualities, these results under this system may confidently be expected; and they further hoped to be able to bring to the manufacture of cheese the advantages of system, method, and economy, enjoyed by other associated manufactures, and to shew that those advantages which have already attended the transfer of home-spun from the hearth to the organized factory were more or less obtainable when applied to the present varied and scattered system of cheese-making."

It is pleasant to find that, although there has been much prejudice and opposition evinced at the factory system, the Committee have been strengthened and supported in their operations by the advice and assistance of many experienced agriculturists, among whom may be mentioned Lord Vernon. The Royal Agricultural Society has also

given its countenance to the system, and are now actively engaged in investigating the experiment. In reply to the question, "Does it pay," the Committee repeat that each supplier of milk has received a price equivalent to, and comprehending the ordinary profits extractable from the milk under his own dairy system, and that although the past year has not shewn success in every detail, yet the experiment has placed us in possession of a system of organization as regards the manufacturing process which must, in the Committee's opinion, eventually change the entire mode of cheese-making in this country, raising it from its present capricious treatment, to the rank of other industries.

A SOUTH AMERICAN POULTRY-YARD—FACTS AND FIGURES.

MR C. F. PEARCE of Freetown, Massachussetts, has communicated to *Moore's Rural New Yorker* a description of a southern farm where poultry are kept to the best advantage on a large scale. Speaking of the farm, he says :—

It is situated in the southern extremity of Chili, South America, where the rainy season, of six months' duration, is as detrimental to the well-being of all fowl kind as the rigours of our own winters, and where great care and skill are very essential to satisfactory results.

Senor Don San Fuentes commenced his operations in poultry with a stock of two hundred hens and eight cocks, to which he has added thereto, by natural increase from year to year, until now he has somewhere in the vicinity of 6000. Their range is unlimited, as his farm covers 3000 cuadras, equal to 7500 acres. To every 50 hens and 2 cocks is given a house of their own, of which here are six or seven hundred on the place. During the rainy season they are not allowed to leave the coop, except the day be exceedingly pleasant, and then only for a short time. They appear to bear their confinement remarkably well, and with hardly any decrease in the quantity of eggs. While confined they are allowed an extra allowance of animal food. The attendance requisite to the care of these 6000 fowls are one man and four boys. The houses are thoroughly cleaned once a-week, and the interiors white-washed every three months. Every morning each lot of fowls undergoes a careful inspection, and any one found moping or otherwise indisposed, is immediately taken to the hospital, and cared for; and seldom is it but that the indisposition is cured, and she takes her place back again as well as ever. At evening, the boys go the rounds to gather up the proceeds of the day's labour, which will average 200 dozen per day the year through. "Killing time" takes place twice during the year—in the spring, and again at the commencement of the rainy season. All the early chickens are thus disposed of at good prices; and the two-year-old fowl decapitated, to give room for the younger broods. as they are supposed to be past profitable service after the second year. The profits from one year's business amounted to 11,000 dollars (nearly £2200). The sales are 72,000 dozen of eggs, and nearly 20,000 chickens and two-year olds.

These houses are very cheap affairs, and are made by erecting two forked posts, 8 feet long, and distant from each other 15 feet. On these rest the ridge-pole. On both sides of the centre-post, 10 feet distant, a trench is dug, 1 foot in depth. Then small poles are placed for rafters, one end in the trench and the other tied to the ridge-pole, 2 feet apart. Then another set of poles tied crossways, also 2 feet equidistant, and the frame work is complete. This is covered over with thatch, which is found in plentiful abundance, and to be had for the

g. The only frame work about the is the doors at the ends, both of which by 6, and contain each a window d in the centre of the sash, to be d or shut as the requirements of venti- demand. Each house has its com- nt of twenty boxes, for laying, placed the eaves, and partly concealed by es of straw.

e sitting department is also provided oxes, some 300 in number. Here all rought, from their respective coops, as as their incubating propensity shews and placed upon their quota of eggs. water, and a large supply of sand and ashes, are provided, and the sitting hen not allowed to leave the room until she takes her young brood with her. The clutches are then "doubled up;" that is, two broods given to one hen, and the chickenless one sent back to her coop to resume her egg laying. As soon as the young chicks are discarded by their mother, they are taken to their future home, fifty in each lot, and the old ones back to their respective localities.

The fowls are fed three times per day, and their diet so arranged as to always present a variety, although oats is their staple article of food, and always before them in unlimited quantity.

HOW TO MAKE POULTRY PROFITABLE.

WE copy the following interesting article on the management of poultry the *Albany Country Gentleman*:—

elieve poultry, if managed right, one of nost profitable farm products. Many ns suppose they have only to buy a few no matter as to age and condition— hem loose—allow them to pick their liv- ; they can, occasionally giving them food, m water—allowing them to roost on exposed to the cold and storm, or on arm waggons and other implements— hen, if they do not lay an abundance ggs, cry cholera, humbug, nuisance, ofit, &c. This is all wrong, and if per- l in will surely end in disappointment oss. You may feed a hen well, but if does not have suitable quarters—dry, , and comfortable, with cleanliness and —there will be no profit. A perfect sys- nust be adopted if you wish success.

THE POULTRY HOUSE AND YARD.

e first thing, in going into the business, make up your mind about how many vant to keep. A hundred fowls is the st number that can be kept in one build- r yard to advantage. I have tried a larger number, but found it not wise or satisfactory. It is of this number that I speak in the present calculations. The main building should not be less than 22 feet by 30 feet, 8-feet posts, matched boarded on the outside, and lathed and plastered on the inside, except about 2 feet up from the floor should be sheathed with boards, to prevent the fowls from eating off the plastering. This building should be divided into three rooms—a roosting, feeding or living, and egg room; also a covered run, 5 feet wide, on the outside of the building similar to a piazza. The feed room, if possible, to face the south. The yard, if the fowls are constantly confined, of a size not less than 1 square rod to a fowl. This yard, if not naturally so, must be made dry with fine gravel and sand, supplied from time to time; part of it in grass, the other ploughed up two or three times a-year. A few shade trees would also be an improvement. The floor of the house should be of cement, clay, or brick—I prefer the first. The floor of the roost room, except 1½ feet all around it for a walk, should be sunk 6 inches lower than the other floor, to catch the droppings of the fowls, to receive the sweepings of the other

rooms, and loam and plaster as may be desired. The roosts should not be over 4 feet in height; 2 feet by 4 feet scantling split in two, corners rounded off, make good roost poles. The frame work made of 2 by 3 inch stuff, set at an angle of 45 deg., and two roosts on each side, the first one 1 foot from the floor, the other one the space divided. If the roosts are higher than 4 feet, the fowl is apt to injure herself by jumping down. The egg room should have two shelves, 20 inches wide, on each side of the room, the first one 1 foot from the floor, the other 3 feet from it. Nests, 12 inches square on inside, 6 inches deep, made to slide on the shelf like a drawer; no bottom to them, as the shelf answers the same purpose, and they are more easily kept clean. This will allow a walk for the hens of 6 inches in front of the nests. The room should have a small window, not to be made too light; the roost room, one window; the feed room, four windows of good size, light and pleasant, as in this room the poultry spend a good share of their time when shut in. In one corner of this room should be a small slatted room, with a simple roost in it; this I denominate the state prison. All windows hung on hinges, with good fastenings, and slatted with 1 by 2 inch slats, 3 inches apart. All inside doors of slats—the outside ones double, *i.e.*, board, and slat one to be used in warm weather. Frames, with little doors or slides, placed in and near bottom and top of room for ventilation, closed in cold weather. A roof ventilator is cold and generally leaky.

The run floor should be the ground, containing three frames, 3 by 3 feet—6 inches deep—let into the ground to hold ashes and dust for dusting; the rest of floor 3 inches deep with fine gravel; the outside of the run slatted with 1 by 3 inch stuff, 2 inches apart, and a slat door leading into the yard. The main yard of good sized posts, 7½ feet out of ground, 8 feet apart, with five cross bars, 1 by 3 inch stuff, two laths high, nailed one over the other, the top one painted, and projecting 6 inches above the top rail. Now for the fowls.

THE FOWLS AND THEIR FEED.

I have little faith in high-priced, fancy fowls for common farming; I do not believe they lay any more eggs, and think them not as good for raising chicks, as the mixed breeds. I select in the first place, a lot of size, say 4 or 5 lb. hens, bright and handsome single-combs, yellow legs—all top-knots and feathered legs I discard. Age, say two years. Cocks, 5 to 7 lb., of same age, no relationship—about one cock to 10 hens. Those hens I let sit soon after 1st February—the earlier the better, none later than April 1, in this latitude—and raise the chicks; cooping up the hen, allowing chicks to run until weaned, say five to eight weeks. I then select the finest of the young pullets, disposing of the poor ones and cocks when weighing 1 to 1½ lb. Being early, they bring good prices. I take good care of the selected pullets, and they will begin laying soon after 1st of September, and on through the winter. This young stock, I may say, is my first commencement. In the meantime I kill off most of the old hens, and all the cocks, getting other cocks early in the season to start the new stock, in no case allowing any relationship. Fowls of two years bring the best chickens, and those hatched early are hardy and healthy; those hatched in warm weather, sickly, droopy, and lousy. I manage to keep the fowls inside the main building on all rainy or snowy days. And when the weather is very cold, or ground wet and muddy, I go to my hen-house early in the morning, before the fowls come down from the roost, and having previously scattered over the feeding floor fine gravel, some burned bones and oyster shells, I then throw on the floor the feed for the day—a mixture of 3 parts corn, 1 oats, 1 barley, and 1 wheat screenings, in the proportion of 1 quart to eight or nine fowls, depending somewhat on the size of them; also four pans with pure clean water—lock the door and leave them for the day. About twice a-week I give chopped cabbages, turnips, onions, and the like; and twice a-

, meat scraps, soaked in water the night ous. In warm weather, I give, in lieu :getables, grass, clover, weeds, &c., in outer yards—sometimes a little sweet on the ear. I seldom feed meal, boiled oes, and slop feed, believing they are conducive to fat than to eggs, and dur- ery cold weather, I think it injurious to owls to fill their crops with wet food. ı I do feed this for a change, I add a salt and pepper to warm them up.

weep the floor occasionally, adding the pings to the compost in the roost room, ıdd loam, plaster, &c., from time to time. inside of all the rooms should be white- ed two or three times a-year, spring and nd oftener if needed. At night I take a :tand lantern, visit the house, removing all laid through the day, and taking all hens l wanting to sit and put them in the prison; in about three days I let them ınd usually this breaks them up; if not, go to prison again for a second term. out two weeks they are ready to go into gg business again, as they were previous :ir suspension. I also inspect the fowls ght, and if any are found roosting on the :s or boxes, in the egg room, I put them r on the roost; they can be educated to st about as you wish them to do, pro- you are kind and careful with them. no stranger to go into the house alone, ıything that will frighten them in any ıs quiet is also one of the things pro- 'e of eggs.

PROFITS.

ıuld any appear feeble, or sick, or y, which is rarely the case, I take them nd let them range at will around the ;es. They in a few days recover their vigour; if not, and they appear sick, refusing to eat, I introduce them to the guillotine, and their headless bodies are soon buried beneath the compost heap. By this management, I count on 150 eggs per year, exclusive of chickens, to each fowl. The eggs are packed in oats, put in a cool place, and will remain good for many weeks, enabling me to take advantage of the market, and get the best prices.

I think 1 dol. per year will keep a fowl in high condition, and the gross income from each fowl is about 3 dols. per year. In the account, I charge them 12½ per cent. on cost, for rent and repairs yearly; in about eight years they have paid for the building. I can now point to one, 1000 miles away, I put up fifteen or more years since, that contained over 100 fowls, and it is nearly as good to-day. The manure pays for the trouble.

All this may appear like a good deal of expense and little profit. One man pays 500 dols. or 1000 dols. for a Jersey cow, and has as much care and expense, less profit, and more risk, than on 100 fowls.

I write this for persons who would like to go into the poultry business, not for pleasure merely, but for profit, and to help them to eke out a living. There is a good deal of pleasure in it—it is one of my hobbies. I now have only twenty pullets, but fifteen of them layers, in a building on a small scale, the weather being for the most part cold and snowy, and thus obliging me to keep them up most of the time, and not getting the care I would desire. They layed in December, 20 dozen and 7; January, 22⅔ dozen eggs, averaging over 8 per day—fine and rich; none of the watery, blue things, like half of those found in our markets.

The Apiarian.

HIVING BEES.

A CORRESPONDENT, Mr A. Wilson, writes about hiving bees to *Moore's Rural*:—In a former communication, I alluded to my mode of hiving bees. I will now shew how it is done. In the first place, I have a bench 3½ feet long and 16 inches wide, 2½ feet high; also a box a little larger one way than my hive, and 5 inches high. I nail a strip of lath across the inside, near one side, and even with the top, edgewise, for the hive to rest upon. My hives contain about 2000 cubic inches. My hive is high enough to contain the honey caps in the chamber. I sometimes put some pieces of comb in the top of the under part; this entices them to stay and commence work; but the passages to the honey caps must be covered up by turning the caps over. A part of my hives have frames, and in these I put comb. So, having all ready, I put the hives in the shade, and wait for the bees to issue.

As soon as they commence coming out, I take a few sprigs of lemon balm (bee-balm—the small flowered, not the balm with long, red flowers), and rub the hive inside, and as soon as they alight, I set my bench in the shade, as near them as convenient, and put my box on one end and the hive on the other. Then I take the box on one arm and hold it under the bees, and with the other hand shake them into it, then set them on the bench, and place the hive over them, a little corner-wise, to give them air, and they will generally go up readily. But if some linger, take a stick as big as a pipe-stem and stir them up carefully, and they will soon go up, and then can be set on the bottom board. But the hive must not be set down tight; it must set on blocks ½-inch thick, and, if it is hot weather, 1 inch high. Sometimes, in hot weather, they will come out and alight, or go to the woods. "Well," says one, "they didn't like the hive; or they had a place picked out and would go to it." Not so fast; I had one large swarm come out that way, and I put them back in the same hive and got a pail of cold water from the well, and with a broom brush, I sprinkled the ground about the hive, and threw some up in the air and it came down like rain, and so I saved my bees; and so I do with all my swarms in hot weather.

"But," says one, "I can't spend my time in that way. Stop! let me count the cost: A good-sized swarm in June is worth £1: in July, 8s. to 10s.,—and who can afford to lose that amount?"

But I have another way of hiving, somewhat easier than the first named. I have a pole 10 feet long; on this I tie some branches from a tree 2 feet long, and put it in the shade, and when they begin to come out I take some balm and pound it, and put it on the branches, and hold it up among them, and most of the time they will come to it; but this requires practice. By this mode of hiving I save all my swarms.

Now, I wish to say, if any one has a better way, let him shew it, and I will readily abandon mine.

The Naturalist.

ARE PARR FISH OF THE SALMON TRIBE?

THIS point in natural history seems likely to be as fruitful a bone of contention this season as it proved last. The following decision, given at Dunblane, will be read with interest, as it is in direct opposition to that which Sheriff Barclay gave last year. A case heard at Dunblane, lately, decided a point of great interest to anglers. John Spalding, ticket collector, Larbert, was charged before Sheriff Grahame, on a complaint at the instance of Mr Napier, Superintendent of Forth District Fishery Board, with a contravention of the 19th section of the Salmon Fishing Act, 1868, by having taken from the River Allan three smolts or salmon fry. Spalding pleaded not guilty, and was defended by Mr M'Lean, solicitor. Mr Chalmers, solicitor, conducted the prosecution. Two river watchers deponed to the fish having been taken by the accused and being in his possession. The fish were produced in Court, and were of the kind known in the district as "yellow fins;" and besides the watchers, Mr Halliday, Bridge of Allan, and Mr M'Donald, Doune Castle, two experienced anglers, deponed that "yellow fins" were fish of the salmon kind. Three witnesses were examined for the defence. Two of these were fishing in company with the accused, and said, that in their opinion, all the trout he had except two returned by him to the river, were yellow trout, and not parr or smolts, and the other witness—Mr Gibb, Dunblane a well-known angler—said he believed the fish produced were yellow fins, but that he did not consider them to be of the salmon kind, and indeed that he did consider parr to be so either.

The Sheriff-Substitute delivered his opinion at considerable length. After reviewing the circumstances of the case, and the evidence that had been adduced in reference to the facts proved, he said the question was raised, whether the fish which had been produced were of the salmon kind, and inferred an illegal act on the part of the person by whom they had been taken, and in whose possession they were ultimately found by the river watchers. The Sheriff-Substitute said that he felt no hesitation in deciding that the fish produced fell under the statutory prohibition. These fish, which were known in the district under the name of "yellow fins," were in their characteristics different from the ordinary yellow trout, especially in their having the silvery appearance which at a certain period of the year was assumed by all fish of a migratory kind, and to whom these scales seem to be given by nature as a preparation for their life in the sea. The Sheriff referred to the decision which he had given some fourteen years ago in reference to the fish called parr, and said that the present question was not in the position in which the parr question was when he gave his former decision. He said that at that time, though there had been strong scientific evidence adduced in favour of the now established fact of the parr being fish of the salmon kind, that evidence was strictly of a scientific character, and in the face of the popular belief, not only as held by anglers, but as stated in almost all works on the natural history of the salmon, he had not been able to give effect to it, as inferring from it that the taking of parr was a criminal act, and on that ground only, and without deciding the natural history of the question, the Sheriff-Substitute then refused to convict. At that date a paper in the *Transactions* of the Royal Society, and one

Quarterly Review, were, he rather
the only treatises in which the results
periments of the Stormontfield and
rig Ponds had been detailed, and it
o be presumed that the Dunblane
then had access to such sources
ıation. Since that time, however,
al history of the salmon had become
ore widely known, and the distinc-
ıcteristics of all fishes of the salmon
been clearly established, and were
recognized. Moreover, the parr,
r fishes of a similar kind, had by
een specially declared to be salmon.
The fish known as the yellow fin possessed the distinctive features of fish of the salmon kind, and the evidence that had been given to-day by two practical and intelligent anglers supported that view. The only evidence on the other side was that of an angler who still, in the face of all recent authority, stoutly held to the opinion that parr were a distinct species of fish from the salmon, and that the fish in question being of the nature of parr, they too must be held not to belong to the salmon family. The Sheriff accordingly found the accused guilty, and sentenced him to pay a modified fine and expenses.

The Country Gentlewoman.

FRESH WATER AQUARIUM.

:ounterpart to the Wardian Case or nery, we would recommend to our readers a Fresh-Water Aquarium g an elegant and interesting home it. The Aquarium differs from the ish globe in this, that when properly ınd cared for, the water does not be changed, which, if frequently ery injurious to the fish.

:al action in animal and vegetable ces, in some of its operations, exactly :esults; the first, in providing for its n, absorbs oxygen and throws off acid gas; the second does exactly rary, it absorbs the carbonic acid ırows off the oxygen. In the nice ıt of these physical equivalents, and intenance in a state of complete m, consists the whole art of successful ent of an Aquarium. How to do to prepare the Aquarium, and how to most suitable animal and vegetable 'or stocking it, we purpose to shew in r.

quarium should be of a rectangular then the objects within it are not ıppear distorted to the eye through efraction; this form also admits of er construction, it being less liable to l fracture, and also enabling us to of such even strength and thickness st sustain the weight of water within. is unimportant. It may be square, or eight-sided. Fig. 1 represents a l or six-sided one. We quote the ns of a few we have inspected at ick Radclyffe & Co.'s, viz., 16 by 9 18 by 10 inches; 20 by 11 inches; y 12 inches; the height and depth :e; with frames of bronze, or gilt, or ıte. Some persons have a cover of plate glass raised about 1 inch from the upper edge, to keep out the dust, and to prevent the fish from jumping out, which they will sometimes do in their play; but we think a fine wire gauze on the top (see fig. 2), is preferable, as it gives more air. It may be laid either flat or as in the engraving. A cover of either sort is indispensable if cats have access to the room in which it is kept. It is also necessary to have a piece of muslin, the size of one side of the Aquarium, to hang on the outside of it, between it and the window, to protect it from the direct rays of the sun, which are very injurious to the fish, frequently destroying them.

Having procured the Aquarium, the next thing to do is to procure some rather coarse sand (such as building sand), this must be well washed with clean water, to free it from

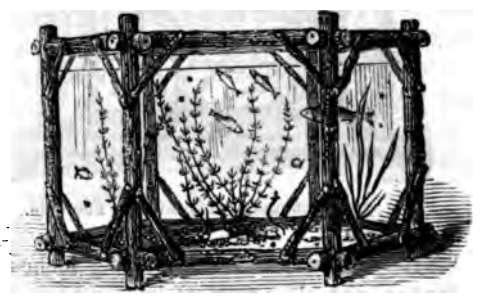


Fig. 1—Rustic Hexagonal Aquarium

clay or other impurities. About 2 inches in depth of the sand, so cleansed, is to be laid on the bottom of the Aquarium; on this, place a layer of fine well washed smooth pebbles. It is also desirable to build up a small piece of rock-work in the centre or at either end, made of material from the bottom of some running brook, taking care, in building it, to leave open spaces or passages between the stones, which not only

give a picturesque, grotto-like appearance, but also afford dark nooks in which the fish

Fig. 2—Aquarium with Gauze Top.

delight to hide. If a pipe for a fountain can be attached, so much the better. Then fill

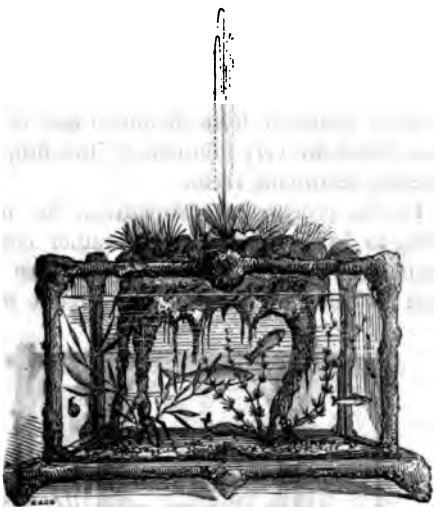


Fig. 3.—Aquarium with Grotto and Fountain.

up your Aquarium to within 2 or 3 inches of the top, with clear river or rain water, and it is ready to be stocked.

Plants can be obtained from any fresh water brook, but it is not desirable to have large-leaved or coarse-growing species. The most suitable are those which grow wholly immersed in the water, as they give out large quantities of oxygen to the water, which plants with large floating leaves, like Water Lilies, do not. The most common or readily obtained, as well as the most desirable, are the different species of Callitriche, or Water Starwort, and Potamogeton, or Pond Weed; the Zannichellia palustris, or Horned Water Weed; Hottonia inflata, or Water Violet, a very curious plant; Leptanthus gramineus, or Water Star Grass; the different species of Myriophyllum, or Water Milfoil; Isoetes, or Quillwort; and Nasturtium officinale, or Water Cress. To these may be added the Lemna, or Duckweed, which makes a pretty addition to the Aquarium, floating on the surface of the water.

In gathering these plants, provide yourself with a can or pail filled with water; remove them with a ball of earth or mud to their roots if possible, placing them in the pail of water for transportation, and then plant them with the ball of earth attached, in the sand, laying some pebbles or small stones upon their roots to keep them in place.

After the plants have been introduced, the Aquarium should be placed in a well-lighted position for a week or ten days, to give the plants an opportunity to establish themselves, before putting in the fish. Care must be taken to remove every dead leaf, stem, or other decaying vegetable matter. A sure sign of the plants being in a healthy condition is to see the sides of the tank and the rock-work covered with clusters of air-bubbles when exposed to the sunlight.

ALBERT SMOKING BOWER OR SUMMER HOUSE.

THIS is, in fact, an umbrella tent bower, where the inmate is quite secure from the inclement weather, and where he can enjoy a cigar with the greatest *nonchalance*, secure from general observation. A bower

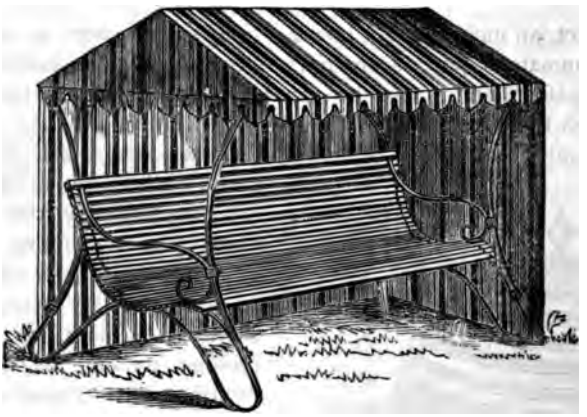
An Umbrella Smoking Tent.

of this kind is more suited for the cricket field, the race-course, the common, and the park, in gala days, than for generally useful purposes about a garden. We prefer, as a rule, such bowers as are capable of being decorated with flowers before we admit them as associates for the furnishing of our pleasure grounds. Still, this is useful for purposes which other bowers cannot serve. It can be put up and taken down at pleasure, with very little trouble, and in these days of pleasure-hunting, that is a desideratum. It is suitable, too, for all weather, and being so, will be readily selected by such as seek shelter from rain, on the one hand, and broiling weather, on the other. With the furnishings it is most complete, offering all the convenience in the shape of seats and table that an ordinary room affords. It is, therefore, besides a smoking tent, a suitable lunching one. Many prefer a sandwich and a beverage of a character to suit individual appetites in the cool shade of an improvised tent in summer, and this will do quite as well as any other thing of the kind in the market. True, it is somewhat cumbrous to move about, but a lot of these placed in public parks in great "outing" days would be much taken advantage of. Some of them might be erected in parks and pleasure grounds for some such purposes as above-named. They are made of steel and cane frame, to adjust as an umbrella, and covered with ornamental waterproof canvas.

VICTORIA FOLDING CANOPY CHAIR.

THIS is a most suitable article of garden furnishing. There are few fine ornamental gardens without seats, and the drawback in time past was in their being of little use, unless for evening promenading. An awning did not seem to be considered necessary at that time. Modern taste and demand for comfort suggested the idea of having these garden seats as useful for day as evening rest. Shade, in the contemplation of country landscapes, is agreeable, and we have therefore now several parties offering registered seats, with certain descriptions of awning, to provide for the growing demand. Mr Pierce, of Hatton Garden, whom we have to thank for the illustrations of summer houses, has also a

design in covering a garden seat, which he distinguishes by the name of "Pierce's Registered Victoria Folding Canopy Chair." This, like all other blinds, can be drawn up and folded away at pleasure. The illustration sufficiently indicates the style. We may state that the seat is of suitable wrought-iron frame, with wooden back, to ensure strength and durability. The awning is strongly secured to iron framing, and the back or end curtains are readily opened at pleasure, thereby forming a fully perfect chair for garden comfort. It is certainly a neat cheap, and useful canopied chair, which will recommend itself to any one wishing to buy.

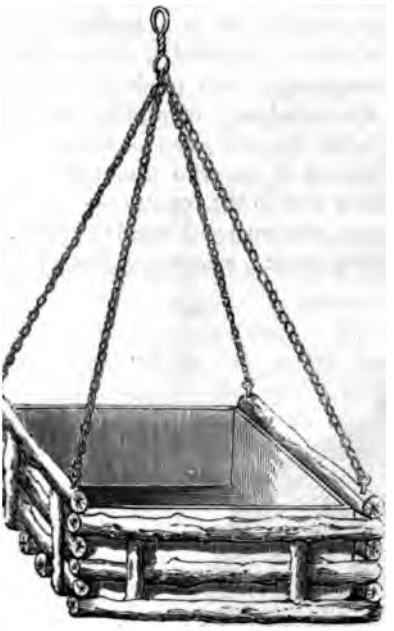


Pierce's Victoria Folding Canopy Chair.

RUSTIC HANGING BASKET.

SOME of our readers may be anxious to know whether we recommend baskets of wood of various kinds, or of burnt clay for Orchid culture. In reply, we have to state that either do well enough. Where the natural is catered for to a great extent, then a basket of the form and material such as is engraved below, is probably the best. For small plants, pot-baskets, such as are to be had from various potteries, do very well. They have this advantage over the wooden basket in being more durable. That should not, however, so much weigh with the grower, as the keeping up the health of the plants. It is an object to have a medium that will speedily pass water through it for the majority of epiphytical plants, and, of course, a basket however well packed with compost, will not retain the water so long as even a perforated pot. But, again, in estimating this fully, we have to remind our readers that much depends upon the atoms of compost and their mechanical construction. If you introduce a great quantity of potsherds mixed with a little charcoal, and probably put only a superficial layer of Sphagnum, then water will push through it impetuously. A basket is not often quite so loosely filled with compost or material, therefore the answer to this is, much will depend upon your system of potting. One manifest advantage of a roomy square basket over a circumscribed-pot is that the large fleshy roots of such plants as Saccolabiums, Aerides, and such like plants, are not tortured in confinement. As a rule, these families, and the species of which they are composed, shew a disposition to thrive in inverse proportion to their roots being con-

No system of pot culture has ever that the roots of the plants like to be



Rustic Hanging Basket.

d round in concentric lines. Their : clearly is to progress, either vertically climbing, often in a zig-zag direction upon the bark of trees, or horizontally *in vaccuo* Whenever an obstruction presents itself to the growing root, let it be a wall, or the side of a pot, then it embraces it and starts away generally at right angles, either vertically or perpendicularly, oftenest the latter. Baskets, then, are good in this respect, and they present the sort of surface that the roots in a state of Nature readily enough take to. Then, when suspended from the rafters, or tie rods, or other fixtures of the house, the roots have a free play after they have utilized what surface they care for, they can dip down into the vacuum beneath. There are many kinds of cuttings used for basket manufacture, such as Cork, Pear, and Apple. There is nothing so substantial in its duration, and not inimical to the health of the plant, or the propagation and encouragement of roots, as Teak. It is now largely used and be can bought in quantities at any seaport town. We understand some houses in the nursery and seed trade supply baskets to any who want them. Our readers may apply in that quarter if they cannot manage to command cuttings, and take the trouble of getting them made into baskets at home.

ROSE TEMPLE OR SUMMER HOUSE.

) be embowered within a canopy of Roses is, possibly, one of the most ng sensations that could be experienced real lover of flowers. If it is delightful : dweller in the country, who, it may be revels in the wide field of Nature in all rain of forms of tree and plant beauty, positively thrilling must it be to those escape from the confined atmosphere of ty or town? With quickened pulse and yant step, the gay heart of youth is ified in moving beyond the bounds of ty to spend holiday time with friends in ountry. The quietness and seclusion : country house direct the thoughts of the dwellers in cities in quite a new direction. Some object to the extreme solitude, and long for companions to, in some measure, accustom them to the comparative tranquillity of their position. Others, again, find sufficient food to occupy their minds, and while they are enjoying the beautiful inflorescence and the clear bracing atmosphere, they are at the same time drinking in that food presented to the mind which makes them wiser, and, it is to be hoped, better members of society. It is wholesome to have a degree of fellowship with Nature, and to admire the many beautiful aspects of Nature's offspring. Steady observation and calm reflection upon the

:s of the vegetable kingdom, that pass the eye during even the limited time holiday season, will put the party or in possession of facts which would months if commencing to learn from

Object lessons are most valuable, any are careless enough, and indifferent ı, not to profit by them. It is, for :e, pleasing to know a Fern from a Moss. ıires observation and eye discrimina- know that; but surely it is vastly more g to know the name of the particular

A Rose Temple or Summer House.

o that you may be able to tell another is. It does not say much for those ı a pleasure-seeking in the country know an Oak from an Ash, or a ıt from a woodcock, and yet thousands ıve had good enough opportunities pply the analysing eye, and conse- are ignorant when they might be se. Upon the grand division-of-labour- e, some may say this is not necessary, is not a question upon which division ur is involved at all. It is more a question urging all to make themselves better informed upon things with which they are coming in contact. The change from city to country life is a marked one, and compels more scrutinizing observation, fires the imagination, and produces enthusiasm, from the varied and interesting objects that pass before the eye. Let us, however, quote the feelings of one who thoroughly enjoyed a holiday visit to the country :—

"To me, who am accustomed to be idle, without being vacant, whose thoughts are rather wandering than busy, and whose fancy rather varicose than vivid, the soft and smallest painting of Nature in this beautiful retirement of my friend is particularly suited. Here, where I am seated at this moment, in a little steady arbour, with a sloping lawn in front, covered with some sheep that are resting in the noon-day heat, with their lambkins around them; with a grove of Pines on the right hand, through which a scarcely strong breeze is heard to faintly whisper; with a brook on the left, to the gurgle of which

'illow on its side seems to listen in
:. This landscape, with a background
itant hills, on which we can discover
ıoke of the shepherd's hut rising in large
'olumes to a thinly festooned sky. All
rms a scene peaceful though enlivened,
ɔus of care, yet rich in thought, which
:s my indolence with a congenial quiet,
gnifies it with the swellings of enthusi-
nd dreams of imagination."

s, indeed, was a spot of improved
l scenery, where the imagination could
and, where feelings of unutterable
re, would be awakened. But to
e to the full in the varied scene
the compass of the eye, a resting
must be provided. In all our fine
es of scenery, where the foreground
ially has been much improved by the
of the landscape artist, some convenient
is appropriated for a bower or summer-
. While it gives repose to weary limbs,
:o the aged, it snugly offers a cool re-
to all, out of the reach of the summer

The sultry influence of Sol is indeed
uring these clear bright days, and a
r, or a house of any kind, becomes one
ıe greatest requisites in the pleasure
ds, be they large or be they small.
: indulging in the comparative degree of
ence, a look-out from such a rose
e, or summer house, as engraved, is most
able. It accords best, indeed, with a contemplative mind. Here the individual is not shut in from observation, nor shut out from the landscape. He can, indeed with Thompson, in his "Castle of Indolence," declare:—

> "I care not, Fortune, what you may deny,
> You cannot rob me of free Nature's grace;
> You cannot shut the windows of the sky,
> Through which Aurora shews her brightening face:
> You cannot bar my constant feet to trace
> The woods and lawns, by tiny streams at eve,
> Let health my nerves and finer fibre force;
> Of fancy, reason, virtue, nought can me bereave."

A design in wrought iron of the kind is of artistic character, and while it would be quite the sort of thing in a picturesque spot, it would not be out of place in a geometrical flower garden. It is one of those designs, indeed, which might be set down in any position of the pleasure ground, always excepting the extreme natural. Nothing of this description accords so well as the rustic embellishments which we have from time to time recommended. Wire or iron designs in connexion with rockery or scenery of that description, is not in keeping. In almost every other position, one or other of its forms is quite permissible as an accessory. Let it by all means be clothed with Roses, or Honeysuckle, or Hop, or Clematis, or Aristolochia, or any other favourite climber suitable to the district, and it will be vastly more enjoyable.

RUSTIC JARDINETS.

THE French word *Jardinet* (pronounced jar-di-nay) means a small garden, and is usually applied to small enclosures or beds margined with ornamental pottery work. The name is also given to large terra-cotta vases intended for growing plants, and more especially Ferns, for which they are peculiarly suitable. Some very beautiful ones, in imitation of the trunks of trees, are to be purchased at very moderate prices. We are indebted to Messrs Dick Radclyffe & Co., High Holborn, for several artistic and beautiful designs, which we now present to our numerous readers.

Balmoral.

Sandringham.

Merlin Oak.

Queen's Own.

Vindolina Thorn.

Brodick Castle.

THE

COUNTRY GENTLEMAN'S MAGAZINE

SEPTEMBER 1871

THE IRISH LAND ACT.

AT a time when so much is written on the subject of emigration, when our agricultural labourers are so continually allured by fairy visions of high wages and discomfort, to leave fair wages and comfort, and when our farmers are exhorted to give up the position they now occupy—sometimes rather an unenviable one, we must confess, through uncertainty of tenure and excess of game—to become landlords in some dismal swamp out west, it is pleasant to read such a pamphlet as has just been written by Mr Robert Donnell, of Dublin, entitled "Farmers their own Landlords: a Plain Tract for Plain People, shewing how Tenants may get Farms Rent Free." This publication has been written to illustrate some features of the Irish Land Act, which the writer supposes have not attracted much public attention, viz., the purchase clauses of that Act. The object of these clauses is, by the aid of Government loans on easy terms, to enable farmers to become their own landlords.

In Ireland, under this Act, a tenant can borrow the larger portion of the ascertained value of his farm from Government, which is repayable in a term of years. Thus, A. occupies a farm for which he pays an annual rent of £32, 8s., the estimated value being, say, £750. He can borrow from Government £500, and thus, with £250 of his own—he completes the purchase. Government asks that its loan of £500 should be repaid by annual instalments of £25. In a period of thirty-five years, the debt, principal and interest, is then extinguished, and the land belongs to A. and to his heirs for ever.

Formerly, he would have had to pay as rent, £32, 8s. This now ceases, and payments are as follow:—

	£	s	d
Head rent	3	10	0
To Government	25	0	0
	£28	10	0

Or less by £3, 18s. than formerly paid.

It may, however, be asked, supposing A. has to borrow the £250 requisite, in addition to the loan from Government, to complete the purchase, how will his annual payments stand?

The question is answered thus:—

	£	s	d
Head rent	3	10	0
Government	25	0	0
Five per cent. interest on £250 ...	12	10	0
	£41	0	0
Former rent	32	8	0
Increase of annual payment	£8	12	0

But if, on the other hand, A. has possessed £250, for which he would receive from the bank, on an average, 2 per cent. per annum as interest, his position would be as follows:—

	£	s	d
Head rent	3	10	0
Annual payment for 35 years to Government	25	0	0
Loss of interest on £250	5	0	0
	£33	10	0
Former rent	32	8	0
Increase of rent or charge	£1	2	0

Of course, the foregoing calculations would result more favourably for A. the less he had to borrow from the Government, and the more he had of his own.

The Irish Land Act, if for no other than the purchase clauses, of which this case is an example, is indeed a priceless boon to Ireland; and Mr Gladstone, Mr Bright, and the Liberal party, may well be proud of their legislation in this respect.

But while thus congratulating Government and the country in the endeavours to heal the wounds inflicted "during centuries of wrong" (to use an O'Connellism) on the Sister Island, we are led to ask if such an Act would not, in many respects, do good in Great Britain?

Probably, such an Act for England Scotland, modified to suit the differe cumstances of the countries, would b ductive of good to the farming interes in many instances, we believe, it would benefit to the owners of land. At all e it might do much to soften the acr displayed by agitators on the land que as opportunities would be given wherel number of landlords would be increase

What we desire is a modification laws of entail, and greater facilities f easy transfer of land, such as are giv the Act under consideration. Und provisions, transfer is made by chang name on the record, thus avoiding that of all human ills—an Attorney's Bill.

FARMERS THEIR OWN LANDLORDS.

WE give prominence to the following communication from an esteemed correspondent, a tenant-farmer. He writes strongly, but in his own person we believe he has suffered much from over-preservation of game, and his remarks generally upon the question of land tenure are worthy of every consideration, in so far as they apply to the necessity of securing the tenant against loss, should he be arbitrarily turned out of his holding. We are by no means sure that it would be better for the general good to parcel out the land into small quantities; it will not be denied, we imagine, that justice between man and man demands that the tenant should be made legally as well as morally certain in dependence upon "word of honour," that the results of his toil and his expenditure should not be filched away from him on a moment's, or, what is practically the same thing, at a year's notice to quit his farm.

"It is a satisfactory sign of progress in ideas and freedom of expression" (says our correspondent) "to find that remarks on questions, with the above and similar titles, are read now in agricultural journals, without being st tized as tending to revolution, confisc communism," &c.

"The outcry (he continues) that raised against Mr Bright's proposal to the cultivator to become the propriet the land in Ireland, is still remem vividly by most of us. Notwithsta this outcry, many of the earnest, t farmers of England saw clearly there could be no stimulus to exertion improved cultivation equal to the f that their efforts in this direction woul tainly result in the improvement of *own property*, and could not be claime any but themselves.

"Another very important view of the is this, that the entire security of the i ment of the cultivator of the land afford best possible security to the public that land shall be made to yield her inc The cultivator, when he feels that he i liable to quit his farm and leave the val his improvements behind, will naturall ploy more labour and more manure. certain consequence will be the incre

the wages of the agricultural labourer, and the increase of the food of the people.

"The public, under the pressure of high prices, are beginning to see the necessity of the removal of all obstructions to the increase of the produce of the land. The unsatisfactory state of land tenure is the greatest of these obstructions, because it includes most of the others. The insufficient application of capital to farming is directly traceable to want of security. The action of the Game-laws is an obstruction, because the landowner does not feel the injury that is done to the crops by hares and rabbits. This loss falls mainly upon the cultivator, but is shared in part by the consumer, in consequence of the higher prices which necessarily follow the lessened supply.

"The cultivator of the land might safely be trusted to protect his crops from undue injury, but the owner who lets a farm and reserves the hares and rabbits cannot be altogether depended upon, to keep the latter, within reasonable limits. It may certainly be called imprudent to make a bargain of any sort without having any legal security for the fulfilment, further than a man's word of honour. Yet this is the case of farmers where the game is reserved by the landowners. The tenant is legally liable for the rent, whilst there is no law to prevent the owner from keeping game and rabbits sufficient to destroy nearly the whole of the produce. Can any one imagine a state of things more entirely obstructive to the increase of the produce of land than this? How can farmers, as a rule, do justice to the land, or to themselves, or to the public, under such conditions? And yet these conditions are the rule, and not the exception.

"What one would desire to see is, that landowners should address themselves to the consideration of this state of things in a fair and impartial spirit, not only in the interest of the public, but also in their own. A more liberal course of dealing with their tenants in the matter of tenure, would improve both their rent-roll and their position in the country; whilst their continuing to ignore the claims and necessities of the cultivators, and the public, may drive the latter to seek for a remedy which may eventually lessen the influence of the landowners.

"It will be a most unwise step to drive the tenant-farmers to the conclusion that they and the public are unfairly treated by the operation of the land-laws. There is already a strong party agitating this question. If the landowners desire to maintain the laws as they are, they should avoid driving the tenant-farmers to join the towns in asking for a change. Farmers are not very active in promulgating their views, and perhaps not very clear, and not very united on many subjects; but there is one subject on which they are agreed, and that is, that the produce of the land, the food of the people of this country, may be enormously increased, and that under a good system of land tenure, such increase would certainly arise.

"I leave it to the public to judge of the good or ill effects of a more plentiful supply of food, of an increased employment of agricultural labourers at increased wages, and of the keeping at home of many of our farmers, to employ their energy and industry with comfort and profit to themselves, instead of sending them out of the country with the feeling in their hearts that the land system of England has not given them fair play."

MANAGEMENT OF REAPING MACHINES.

WE have now all but got out of the thick of the agricultural meetings of the season, and recovered our usual equanimity, and feel quite able to look things agricultural particularly bearing on implements, with more composure than we could when hurried and worried by the whirl of endless examination of machines at the Royal of England and the Highland and Agricultural Society of Scotland's annual exhibitions. We cannot say that we would not experience more pleasure in treating of one class of machines necessary to the farm more than of others; but as we do not mean to look to our own convenience or pleasure, so much as to the benefit which our readers may derive from what we write, we are upon this occasion to treat of reaping machines, now become a necessity in farming economy. Not that we at the present time intend to enter into the question which is the best machine for any particular locality or farm, as we think our readers will have made up their minds on this point. We intend to give what our experience enables us to do—some reasons why the reaping machine has not given that general satisfaction which it ought to have done, and the best way to attain this end now.

In the first place, the machine was not so well manufactured as it is now, and being placed in the hands of inexperienced ploughmen, ignorant of the first principles of mechanism, and to whom therefore no blame could be attached. The machine was used as if composed of materials which it would be impossible under any usage, however rough, to put out of order. Such, however, was not the case, and hence the implements often came to grief, and ultimately were thrown aside as useless, the blame being lavished upon the manufacturers, or agent who sold the machine, while this was due alone to the proprietor of the machine, or his servant, who might or might not be prejudiced against it. Time, however, changed all this; and the machine is now placed in the hands of men who have been to a certain extent educated to understand that it is not made to do an impossible amount of work, but to do so much and no more, and that with careful treatment of its different parts, which are now turned out so perfect and little liable to go out of order, it may pass through a succession of harvests without being perceptibly injured, except in such wearing parts as knife, sections, or bushes, which are easily replaced. The question is—How is or can this be attained? First of all, we must premise that the machine is placed only in the hands of a workman who has passed through an apprenticeship of how to deliver the sheaf properly (we speak of a manual back-delivery reaper), as this is a most important point; indeed, without the proper use of the rake, no machine however good can cut well. The workman must not trifle with this most important part of his work; his eyes, as well as hands, have quite enough to do, more particularly when the grain is not standing erect or leaning to the machine, which will be the exception this year, and when it will be necessary to watch every part of the knife, to see where he can assist its cutting power by judicious manipulation of his hand rake. Then, in the actual delivery of the grain, or "tilting" of the platform, the hand must act in unison with the foot, or else the sheaf will not only be badly delivered, but straws left straggling on the ground; and others finding their way in and around the carrying parts, render the machine more difficult to draw, and racking its finer parts. Another most essential part is the knife, which must be kept properly sharpened, and on this account two sets of knives are absolutely necessary to avoid any chance of hindrance in the field. The knife must also now and then be removed, more par-

ticularly where the crop is grassy, to free it from any vegetable or other matter which might tend to clog or check its free play through the fingers. We saw at Wolverhampton a finger which obviated the necessity of doing what we have now advised, but until it comes into general use, our advice should not be neglected. We think this improved finger, however, of so much importance that we shall here give a short description of it. It is constructed with movable steel jaws fixed upon each side of the finger, which can be removed, ground, and replaced by any intelligent labourer, as they are held secure without the assistance of any bolt or rivet. The finger is so manufactured as to keep the bottom edge of the knife perfectly sharp and clean, and the cost is very little in excess of the ordinary finger. Another and a very important item in the proper management of the reaper, is careful oiling. We do not mean the pouring out of a large quantity of oil upon the bearings or crank, but a regular supply which must be known to find its way to the required part, and not *thought* to do so only. Of course the most important part to oil is the crank, and the most difficult to do well. We came across a plan of supplying this desideratum, at Wolverhampton, in the shape of a patented crank, containing a "Fountain lubricator," or a hollow inside where a week's supply of oil or grease can be secured. The saving of oil, time, tear and wear of the machine, with this improvement, must be considerable. We believe the expense of a crank so constructed, is very little more than that as presently in use.

We have often wondered, when passing through some of the best farmed districts of England and Scotland, to see reaping machines lying in the fields long after the grain was safe under thatch and rope. "Surely the owners of these machines have no intention of using them again," we said to a friend who was travelling with us. His reply was that such was not the case, and that it was not an exceptional occurrence at all to see them lying outside the farm or stack-yard, well on to winter. We would say to these gentlemen, take our advice, and immediately after you finish the cutting of your crops, remove the reapers to the farm-yard, have them at once taken to pieces, properly cleaned and oiled, and laid aside. You will have not only the satisfaction of destroying the hopes of the manufacturer or his agent, who have hitherto been looking on your mismanagement, in pleasant expectation, on their part, of you being compelled to order a new machine; but you will have your reapers in good order, ready to take the first favourable opportunity of mowing the next year's hay crop—remembering that time is money.—*Communicated.*

MR MECHI'S NOTIONS OF SEWAGE.

MR MECHI is an indefatigable supporter and exponent of the value of town sewage. The "sharp" alderman, as we have heard him styled, has done a vast deal of good to the slow people in this country. For many years, it was stated that Tiptree flourished only on the "tips" that were given, and successfully so, from Regent Street—that Regent Street, in fact, paid for Tiptree. This was a mistake altogether, so far as we understand Mr Mechi's farming. He is, to our thinking, a man who has done more good in the way of promoting agricultural improvements than any one within the last quarter of a century. He is an Arthur Young in his way; and his name, we believe, will appear in agricultural history, whenever the doings of the last twenty-five years come to be recorded.

In a letter to a contemporary, *The Agricultural Gazette* (why does Mr Mechi give it the special advantage of his adumbrations?), Mr Mechi writes, in reply to a German correspondent, whose name is not mentioned,

and whose remarks would seem to have been in favour of cesspools, as follows :—

I continue my irrigation. On the sewaged Italian Rye-grass (14 acres) I have kept two hundred sheep and lambs from April, seven horses for seven weeks, and yet a nice little haystack. I only regret that I have not a town sewer to supply my suction-pipe, for I cannot get manure enough in the ordinary way without investing a large additional capital in live stock, which I cannot afford, having to limit my general tenant or farm capital to £16 per acre. It ought to be £25 per acre, and then I should make a larger per-centage of profit. My live stock capital is usually £6 per acre. Could I afford it, I would make it £12 or more per acre, and then I should consume all my straw (treading none under foot), and keep all my cattle and pigs on sparred floors. I have not near manure enough, for it is quite clear that in the case of root crops especially (as I have proved by comparative trial), we could double our acreable produce by means of extra manure and deeper cultivation, without increasing the fixed charges of rent, tithes, rates, taxes, &c.

Besides, when we have provided, by very deep cultivation and a greatly increased quantity of manure, a surplus supply of food for our mangold crop, the corn crops following will be ample, and very different from what we find them at present. Our German friend will fail to bring back Englishmen to the old cesspool system, and if he will but inspect the sewage farms at Hornchurch and Barking, he will no longer doubt the propriety of dissolving ordure in water, and thus cheaply conveying it to the soil. My nasal midnight remembrances of the (good ?) old cesspool times cause me to wonder at your correspondent's letter. Besides, manure is useless without water. The manurial power of Britain is about that of two sheep per acre, and this is mixed with a rainfall of 26 inches, or 2600 tons of water per acre per annum. Mr Hope not only uses all the town sewage, but uses it again and again during dry weather, in the shape of filtered water. While, by steam-power, we can raise 1000 tons of sewage 300 feet high for 13s. to 14s., it will never pay to use horse-power and manual labour in the conveyance of town sewage.

When Mr Mechi says that it will never pay to use horse power and manual labour in the conveyance of town sewage, he is saying only what has been said in our pages many years ago, and, of course, we cannot dissent from the opinion. There is just one remark that we would make upon the correspondent's letter, and it is this, that if Mr Mechi thinks he could make more money by doubling his capital on live stock, he ought to do it. He certainly makes the proviso that he would do so if he could afford it; but surely Mr Mechi could easily be accommodated if he wanted money for live stock on conditions so favourable as he represents them.

ILLEGITIMACY IN SCOTLAND.

AT the Meeting of the British Association in Edinburgh, Mr Seton, advocate, read papers with reference to illegitimacy in Scotland.

1. On "Certain Cases of Questioned Legitimacy under the Operation of the Scottish Registration Act." This paper had reference to the subject of adulterine bastardy. It touched upon the conflict between the legal presumption in favour of a child born in wedlock, being the lawful issue of the spouses, and the mother's conviction of its illegitimacy; and shewed the course followed in the registration of such cases. 2. "The Illegitimacy of Banffshire." This paper gave elaborate details regarding the illegitimacy of births during the four years ending 1861, and embraced a supplementary appendix relative to the four years ending 1869, the records of which are the latest available. It shewed, *inter alia*, that, with a few rare exceptions, the county of Banff has always exhibited the largest per-centage of illegitimacy—viz., about 16 per cent.—the ratio for Scotland being between 9 and 10 per cent. Very considerable difference exists in the different parishes, the maximum rate being upwards of 25 per cent.; and the minimum as low as 6 or 7 per cent. As a rule, the seaboard parishes gave a lower per-centage of illegitimacy than inland ones. Neither the excess of females over males, nor the comparative

ber of houses and windowed rooms (as tained at the census) affords any satis- ry solution of these differences; but regard to the county generally, the parative paucity of marriages may have thing to do with the large amount of timacy. The paper, which was accom- ed by several tabular appendices, also ained some curious particulars relative e occupations of the mothers of illegi- children, the number of cases in which paternity was acknowledged at registra- or found by decree of court; and the ber of children legitimated by the sub- ent marriage of their parents. 3. "The diency of Recording Still-Births." This r mentioned that, while these births recorded in France and some other inental countries, they were not re- ed either in England or Scotland, shewed that the statistics of the ct are very imperfect. The still-births lasgow during three years subsequent 849 were estimated by the late Dr g to have amounted to 1 in 12, or rds of 8 per cent. In France, their entage amounts to between 4 and 4½ per , and in Paris to about 7½ per cent. The ary proportion among legitimate chil- is from 1 in 18 to 1 in 20 of all births, among illegitimate children three times er. More males are still-born than es—viz., 140 to 100. It also referred to difficulty of defining the terms "still- " and "viability," to the supposed pre- e against the registration of still-births, he desirability of their being recorded e ground of public policy and in the sts of medical science. The paper uded with a recommendation that the experiment should be tried in Scotland, and gave some practical suggestions as to the mode in which it ought to be carried out.

Remarks were made by Sir John Bowring, Rev. Mr Caine, Mr Arthur Trevelyan, Mr Macknight, and Dr Hancock.

Mr VALENTINE, Aberdeen, doubted if illegitimacy in the north had increased, and thought that its prominence was due to the attention which statisticians had given to the evil. The old registers of the kirk-sessions (he believed) would shew that illegitimacy, instead of increasing, had decreased.

Mr J. JACK differed from the last speaker. He had looked over many of the kirk-session records for the last century and a-half, and he thought that the number of illegitimate cases had increased three or four times. As one of Mr Seton's papers had reference to Banffshire, how came it that that county stood so prominent in the matter? He believed it was due to the greater or less preponderance of the moral faculties over the animal nature, and this was chiefly influenced by the education and upbringing of the young, and to the influences with which they were brought in contact afterwards. Attention ought to be directed to the Dick Bequest, which, instead of being devoted to the "godly upbringing" of the young, was restricted to the secular education of the children.

Mr SETON, in his reply, said he believed that Scotland was decidedly worse than any other portion of the kingdom in point of illegitimacy. The old registers, however, did not embrace everything; and if anything did escape, it was the illegitimate births; and on the whole, he did not think there had been a great increase of illegitimacy in Scotland.

HARVEST PROSPECTS IN ENGLAND.

MR H. J. Turner, of Richmond, Yorkshire, writing to the *Times* of Friday, says :—

We have had a wet June and July—now within a few days of its close—has given us a deal of rain, with a great lack of its usual sunshine.

The natural result of such a season is to cause a late harvest, and more than ordinary diversity in the crops of corn. I think I never remember a season when the injurious effect of wet weather on the grain crops on poor land was more strikingly shewn.

Wheat on good land, well farmed, is a full average crop ; on poor land, which, generally speaking, is moderately farmed, the crop is thin, and will be very late before it is ripe.

Oats vary much. I have seen some magnificent crops. On the whole, I think this crop will be an average one.

Barley, without being great, is generally an even average crop.

Beans and peas have bloomed well, and are an average crop.

We have not had so good a prospect for the turnip crop for several years. I have recently been over some farms where the leaves of the first sown swedes will soon cover the land.

The potato crop looks very promising ; the chief fear is that so much wet weather as we have had may cause too much luxuriance in the growth of the tops.

On our meadows there is an average, but not a particularly heavy crop of grass. The weather completely spoilt some of the first-cut clover. The meadows now being cut and those cut during the last ten days have had to bear many heavy showers of rain, but the hay is not materially injured.

Our pastures generally are good. I think I never saw the grass on our best pastures so rich in feeding quality, and, when cattle have had even a moderate quantity of linseed cake, I never saw them lay beef on faster.

All kinds of butchers' meat sell at a high rate, and, although it may vary a little yet, as I repeatedly stated, I see not the slightest reason to expect prices to go lower.

Every kind of grain is selling at a remunerating price. Wool, too, is well sold ; in short, everything a farmer produces is now commanding a good price ; the only doubt is if he have enough to sell.

The first ear of wheat I got this year was on the 15th of June ; last year it was on the 13th, and in 1869 it was the 27th of June before I got an ear.

So far as dates go, there was little difference in the time of wheat shooting between this year and last year ; but the scorching sunshine of July in 1870, and the almost total want of it in 1871, has made a great difference in the state of the grain, and I certainly think that the general harvest this year must be quite a fortnight later than that of last year.

MR RUSKIN'S AGRICULTURAL ARCADIA.

MR RUSKIN has a scheme for making the deserts of Great Britain to bloom and blossom as the rose, and to secure health and happiness to agricultural labourers. In commenting upon the latest effusion of the author of "The Stones of Venice," the *Daily News* remarks :—

Here is Mr Ruskin still with faith enough in the redeeming possibilities of the æsthetic to propose to found a model community, a new generation, on the basis of a flower garden. He has subscribed £1000 as the beginning and nucleus of a fund ; and with the fund is to be bought a garden, and on this islet of the blessed is to grow up the new and perfect generation.

The plan is of this kind. When the fund has reached "any sufficient amount"—how much Mr Ruskin does not state—the trustees are to buy with it "any kind of land offered them at just price in Britain." When the land is obtained—"rock, moor, marsh, or sea-shore, it

matters not what, so it be English ground and secured to us"—the new colony, commanded by Mr Ruskin, is to set to work at its culture, carefully ascertaining what flowers, fruits, and herbs it will naturally bear, and then labouring to bring it to absolute perfection. The labourers are to be paid "sufficient and unchanging wages." The children are to be "educated compulsorily in agricultural schools inland, and naval schools by the sea." The boys are to learn, as a first condition, either to ride or to sail; the girls to spin, weave, sew, and to cook all ordinary food exquisitely." How gladly would most of us accept an invitation to dinner in that incomparable colony! And boys and girls alike are to be "disciplined daily in the strictest practice of vocal music." For, in reality, they are to be taught "gentleness to all brute creatures; finished courtesy to each other; to speak truth with rigid care; and to obey order with the precision of slaves." Boys and girls alike are to learn Latin; they are to be taught the natural history of the place they live in; and "the history of five cities—Athens, Rome, Venice, Florence, and London." Other cities, we suppose, are not worth knowing anything about. Paris has a history, not perhaps wholly uninstructive, and so has Vienna, and Jerusalem might teach something, and even Constantinople. But Mr Ruskin cares for none of these things. Of course, to name such a place as New York would, to such a sage, seem an impertinence.

We are not told anything about the manner in which the Arcadia is to be colonized: how the colonists are to be chosen, or how governed, whether by patriarchial rule or republican self-rule; or how much money it will cost to try the experiment, even on the smallest scale; or where the funds are to come from—or anything, indeed, about how the work is to be done, or begun, or attempted. Mr Ruskin himself acknowledges candidly that he does not know to what extent he may be able to carry his plan into execution; but he manfully declares that "to some visible extent, with my own single hand, I can and will if I live." We cannot, then, criticise the method of putting the scheme into execution, or even the possibility of accomplishing it. We know nothing, and are allowed to know nothing of that. We must only accept Mr Ruskin's word that it can be done, and will be done. Suppose a piece of thoroughly cultivated land somewhere in England, worked and occupied by persons, who all, men and women alike, spoke Latin, and were taught to sing, and knew the history of Athens, Rome, Venice, Florence, and London, would the great problem of social happiness and perfection be any the nearer to solution? Would the colony convert the world outside; or the world outside pervert the colony; or the world keep on its old way, and Arcadia disappear? In Brook Farm they taught not only Latin, but Greek. The girls learnt how to milk a cow, and make a shirt, and read the "Antigone;" and the poet or scholar who strove to learn hay-making or hedge-clipping in the morning, expounded "Euripides" and "Plato" in the evening. The men and women who laboured and learned there, are nearly all alive and well to this day, and many of them have not yet passed their prime—and Brook Farm is a tradition, and the people who live on its very scene have well-nigh forgotten all about it.

Agricultural Engineering.

MARSDEN'S STONE-BREAKING MACHINE.

THE accompanying illustrations shew the recent improvements in machinery specially adapted for breaking stone for road metal, patented by H. R. Marsden, of Leeds.

Mr Marsden, for a long time, has been engaged in manufacturing stone-breaking and ore-

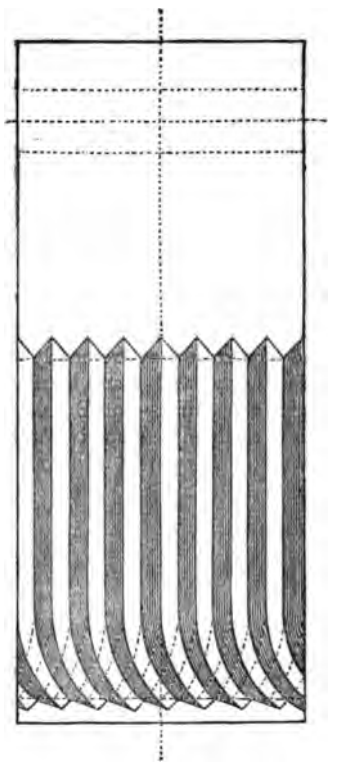


Fig. 1.

crushing machines. These have stood unrivalled for their power in breaking and crushing stone and ores of any description. The one great difficulty he has had to contend with, has been in making a road metal of such a form as would satisfy the eye; and he has long since proved, by practical experience, that stones do not require to be perfect cubes in order to be most suitable for Macadam roads. It is, he says, an erroneous theory that most surveyors believe that a stone should pass through a 2-inch or a 2½-inch ring, in every direction, in order to be good road metal. Materials of this form will not lie permanently on the road, unless they are placed in perfect order, and we know that in making Macadam roads, the stones are thrown on promiscuously; hence, if the stones be too round or too square, they will not lie, and casual observers will find, on any road of this description, that it is the round and cubical stones that roll about, and will not embed themselves.

The present machine, of which we give illustrations, was exhibited in operation at the Royal Agricultural Show at Wolverhampton, and made a capital sample of road metal. Mr Marsden has decidedly hit upon the true principle of Macadam stone-breaking. It will be readily understood by referring to fig. 1, which represents the jaw having sharp teeth, the lower end of which is convex, the teeth running off diagonally; the dotted lines on the lower end represent the fixed jaw, which is concave at the bottom of its face, the teeth running off diagonally in the opposite direction: that is, one set runs to the right and the other to the left, leaving the only space for the stone to escape a perfectly diamond shape. It is impossible for stones to get through, as in the old machine. The plan, fig. 2, also shews the improvements in this machine. The two sides forming the main frame, which are required to be of considerable weight, are made in two

pieces, and bolted down on a bed-plate, thus making it lighterfor transportation. Fig. 3, page 156, is a side elevation, shewing all the fly-wheels, and which runs at a great speed, to be at the bottom, making the machine to be much more steady. We ob-

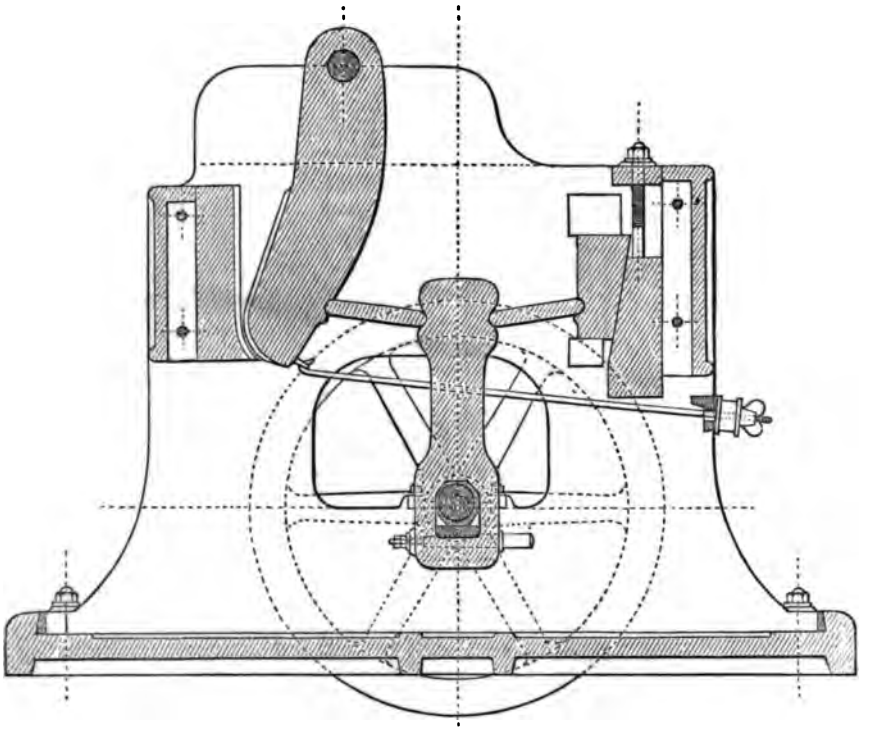


Fig. 2.

parts in their place. By this view, the late improvements will be readily understood. It also shews the eccentric shaft which carries serve that a first class medal was deservedly awarded to this machine at the Highland and Agricultural Society's Show at Perth.

DISINTEGRATING WHEAT MILL.

AT the meeting of the British Association at Edinburgh, Mr Thomas Carr read a paper "On a New Mill for Disintegrating Wheat." This mill, the paper stated, reduces wheat by percussion, while it is unsupported, and falling freely, or being projected through the air. The wheat, in passing through the machine, is struck by a series of bars moving at an immense speed in opposite directions. It is so instantaneously reduced into a state ready for bolting, that no injurious heat is caused, and the flour produced is of a much superior quality to that obtained by ordinary grinding, while the cost of its production is considerably less. Messrs Gibson & Walker, of Bonnington Mills, Edinburgh, have one of these machines in its perfected state, in full operation, and the following is the per-centage of produce of two different lots of wheat passed through it:—Old Scotch wheat produced—Flour, 45 per cent.; semolina, 26 do.; bran flour, 4½

do.; exhaust flour, 1½ do.; seconds, 4 do.; parings, 1¾ do.; bran, 13 do.; black dust, &c., 2¾ do.; loss, 1½ do. = 100. The other was a mixture of Baltic and Ghirka wheats, and produced—Fine flour, 35 per cent.; semolina, 36 do.; bran flour, 4½ do.; exhaust flour, 1¼ do.; seconds, 3¾ do.; parings, 2 do.; bran, 13 do.; black dust, &c., 3 do.; loss 1½ do. = 100. These statements shew the varied effects to the cost of working, they pointed out the very much smaller prime cost of the disintegrating flour mill compared with that of the twenty-five pairs of millstones it supersedes; also the very slight and rarely needed repairs it requires, against the keeping in order of so many pairs of millstones; the fewer men required, and consequent saving in wages; the exemption from loss

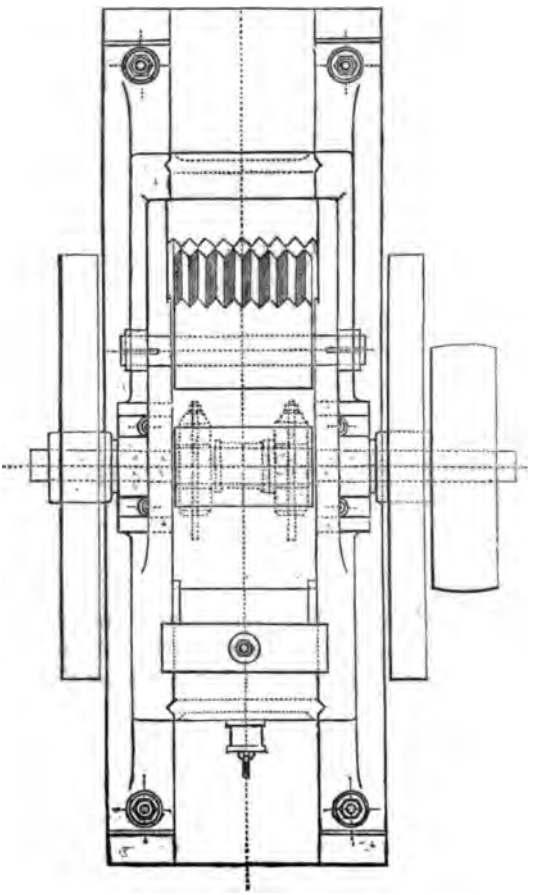


Fig. 3 (see page 154).

produced by this novel process on different descriptions of wheat. The quantity of semolina obtained from hard wheats, it will be observed, is much greater, and that of flour much less, than from soft wheats. But what is of most importance is the ultimate results. The quantity of finest flour obtained, varies of course according to the quality of the wheat used. In regard by scorching and greatly diminished fire insurance, the small ground and space occupied, and the much less driving power needed in the one case than in the other.

Mr BRAMWELL said he had, along with the President of the Section and others, inspected the mill, and he thought there could be little doubt it was a very ingenious machine. He had thoroughly inspected the principle

of action in a variety of ways, with great satisfaction to himself. The result of the inspection was as follows:—The machine, in grinding 20 quarters an hour, took 145 gross indicated horse power; when grinding 15 quarters, it took 123-horse power; when running empty, grinding the air, it took 63-horse power; but when both discs were lashed together, so as to run in one and the same direction, it only took 19-horse power, because the air was not being ground. When running empty at half-speed, it took one-seventh of the power it took when running at full speed; but if the calculation could have been closely made, no doubt it would only have taken one-eighth of the power. In regard to the production of the mill, he was not a practical miller, but he thought it was producing an extremely good quality of flour. The machine appeared to him to be on an entirely new principle, and was certainly most ingenious.

Mr Siemens said he quite approved of the principle of the machine, but he did not gather, from what had been said on the subject, whether a comparison had been made between the power required for a certain amount of work by this machine, and a similar amount of work by the old millstone principle.

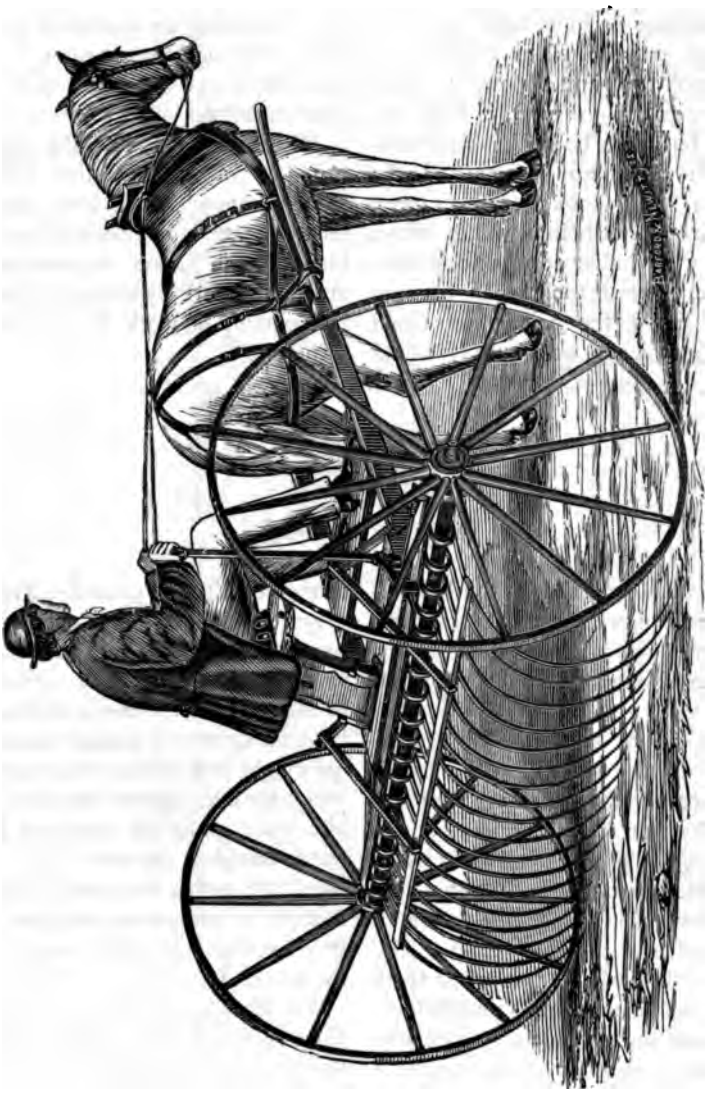
HORSE RAKES.

In the class of Horse-rakes at the Wolverhampton meeting, we noticed several bearing marks of improvement; and on stand 107, Mellard's Trent Foundry Co. (Limited), of Rugeley, was shewn an entirely new one, the invention of an American gentleman, with patented improvements by Mr Alfred Giles, the energetic manager of the Foundry Company. We give an illustration of this rake, from which it will be seen it is carried on large wheels, permitting it to travel with greater ease over hilly and uneven land, gutters, &c., and also saving draught. The axle of the travelling wheels carries the teeth for raking, which are made of round steel; and the part next the axle is coiled specially, so that on any weight or undue pressure being brought on to the tooth, this coil stores up some of the pressure, and, as it were, brings it to bear on the tooth, assisting it to keep its shape. Apart from these advantages, however, which are only minor ones, the machine has a simple and efficacious mode of discharging its load, and resuming work again, and can be adjusted to any required height—the closest cut grass or the longest stubble, as the case may be, and, in either case, without permitting the teeth to scratch or bite the ground. The seat for the driver, as shewn in the engraving, is placed over the axle, and is pivoted to oscillate forwards and backwards about a couple of inches, so that when the horse is walking down hilly land, the driver, by leaning backwards, throws his weight just behind the centre, and thus brings the rake tight on the horse's belly-band; and when going up hilly land he leans forward, bringing the rake tight on the back band, and easing the tines off the ground just enough to compensate for the difference of level between where the horse is walking and the wheels travelling.

For discharging, an upright lever is placed close to the driver's right hand, one end of this lever being securely fastened to the axle. In this lever a bolt is placed close to, and parallel with, the axle, having a spiral spring on the bolt to keep it in its place. The driver presses the lever from him, which action forces the bolt into recesses cast in the knathe of the right hand or off-side wheel; then, when the rake is travelling, the recess grips the bolt and carries it round with it, and, as a consequence, turning the axle and lifting the tines, and when the axle has made some portion of its revolution, it strikes

against an inclined bracket fixed to the shaft, this incline gradually drawing the bolt out of

fall into work again, the upright lever ing against a plate placed on the c



Mellard's Trent Foundry Co.'s (Limited) Horse Rake.

the knathe the farther round it goes. The instant it has drawn it out, the teeth at once

seat, which is slotted, so that it m shifted to stop the lever in any positio

NEW AMERICAN REVOLVING MOULD BOARD PLOUGH.

AMONG the many interesting implement exhibits at the Wolverhampton Show, held lately, was the "New American Revolving Mould Board Plough," shewn by Messrs Mellard & Co., Trent Foundry, Rugeley, and we have now the pleasure of giving an engraving of it, which will assist our readers who have not had the privilege or seeing it, in understanding its mode of working; but soil piece by piece, whereby it is thoroughly disintegrated, and subsequently thrown ove or dropped down according to the angle wit the furrow at which the revolving disc is se The action is produced by the furrow strikin the lower part of the disc, and as the forwar motion of the plough presses the disc to th furrow, it revolves from the furrow, and ther by throws upwards whatever moulds a

New American Revolving Mould Board Plough.

before doing so, we may mention that it was entered amongst the hop-cultivating implements at the Wolverhampton Show, and a silver medal was awarded to it for the adaptation of the principle of a rotating disc mould board.

The effect of this plough, under certain conditions of the soil, is most complete. The action it produces is simply a lifting of the pressed against it. It is rather a misnom to call the work done by this implemen ploughing, as its operation is more like di ging. It inverts the surface soil, and leav what it has raised from the subsoil on th surface, in a highly pulverized state, alor with any root weeds which it meets wit We believe that, considering the amount work it performs, it is of easy draught.

The Farm.

IMPORTS AND EXPORTS OF AGRICULTURAL COMMODITIES.

THE Trade and Navigation Accounts, which have just been issued for the month and the seven months passed, shew that our receipts of cattle from abroad, on the month, was smaller by 1500 than in the corresponding month of last year, notwithstanding the higher price of beef in this country. If we were to look at the importation of cattle alone, the inference, in connexion with the fact stated above, would necessarily be that the cattle are not to be found. High prices do not bring them. There is another alternative, however: the appliances for sending cattle across the ocean—even when Ocean is in its kindliest mood—are by no means satisfactory. On road and river, sea and shore, there is much need of improvement in cattle transit. The trucks in which stock is sent at the present time are disgraceful to the railway companies, and very detrimental to graziers and feeders.

Beef and mutton just now are at ransom prices; and, dear as they are, we believe they do not pay salesmen and butchers so well as if they were 1d. or 2d. per lb. less. For this reason, that the mass of the people cannot afford to buy except in small quantities, and it is the mass of the people who pay the butchers, not those who take special joints. At all events, butchers, as a body, calculate more upon their general than their special customers.

With this little semi-digression, we "return to our mutton"—literally, beef—and to figures, which are often tougher than foreign cattle, because, within the last year or two, there is a manifest improvement in the getting out of foreign stock. The total number received in the course of the month was 12,082 of oxen and bulls, against 14,605 in the corresponding month of last year. In the seven months, however, we had about 8000 more than up to the end of July last year, but 30,000 less than in 1869. The figures were, for the by-gone seven months of this year, 74,085; last year, 66,891; in 1869, 105,363. There was a very large increase in the import of cows — an increase which we by no means appreciate, as it is generally through cows that disease finds its way into our own herds. The number imported during last month was 8454, more than five times the number received in the corresponding month of 1870, and four times as many as in July 1869. On the seven months, the increase over last year was treble, and over 1869 more than double. The numbers for the seven months ended July this year were 26,449, to compare with 8353 last year, and 12,516 in 1869. The supply of calves was larger both on the month and seven months.

There was an increase of over 40,000 in sheep on the month, and above 80,000 on the longer period; but there were 10,000 less than we received in the first seven months of 1869. The value, however, was considerably higher than in 1869. For 495,196 sheep, up to the end of July 1869, we only paid £808,498, while this year we paid £901,101 for 489,346. The price per head this year was therefore about £1, 17s. 3d., while in 1869 it was only £1, 12s. 8d.

Of swine we had a much larger supply during the month than in the corresponding month of last year, the numbers being 13,638, as against 8867. On the seven months, however, the increase was not so marked, the numbers being, for this year, 51,492—last year, in the like term, 49,956.

This year, we got our porkers at a cheaper rate than last, the sum paid this year being £175,683—last year, in the same period, £184,690.

Bacon was in greater demand, or at least in larger supply, both in the month and seven months, than it was last year, and there was, as in the case of pigs, a marked decline on prices. For 593,852 cwt. of bacon received up to the end of July, the sum disbursed was £1,511,120; last year, up to the same time, we had to pay £1,154,848 for 376,866 cwt. There was a large increase in the supply of "salted" and "fresh or slightly salted beef," the quantities being, of the former, 195,541 cwt., and of the latter, 10,711 cwt., as against 107,500, and 6968 cwt. up to the end of July 1870. The cost for this meat was £454,703. For hams we are credited with £102,769. Then there is pork, salted and fresh, for which we put our hands in our pockets to the extent of £567,710, and for game and poultry we paid £65,769, a slight reduction in the latter case upon the sum we paid in the like period of last year. £5,495,346 is the sum we have given for animal food up to the end of July, which appears to be a great deal too much for a country so well able to produce beef and mutton itself if its resources were made the most of.

There was a large increase in the imports of dairy produce. Of butter, we received in the seven months 737,360 cwt., as against 596,094 cwt.; and of cheese, 496,290 cwt., to compare with 350,085 cwt. in the corresponding period of 1870. For butter, we paid, for the seven months, £3,864,261, and for cheese, £1,410,850.

Our wheat imports during the month were very much larger than in July of last year, larger also than in the corresponding month of 1869. In the month, we received 4,633,120 cwt., as against 2,878,873 cwt. in 1870. In the seven months for which the Trade and Navigation Returns are made out, we have imported 19,386,678 cwt.; last year, the quantity was 16,721,997. The foreigners have drawn heavily upon us this year for wheat, their bill for the seven months amounting to £11,403,685. Russia and the United States, as usual, were the largest creditors, the one claiming £4,261,349, and the other £4,231,894, for the seven months, or more than two-thirds of the whole. It is singular to note that France, to whom the generous farmers of this country have been sending seed-corn, is able to supply us with more than she did last year—21,494 cwt., as against 9506.

The following tables shew the quantities and value of the corn we imported during the past seven months. Here we desire to make a correction with reference to the figures of our summary of last month. The figures quoted were for the six months ended June, and not for the month of June itself.

QUANTITIES.

Wheat.	Seven Months ended July 31, 1870. Cwt.	Seven Months ended July 31, 1871. Cwt.
Russia	5,177,209	7,486,482
Denmark	222,742	33,433
Germany	2,254,845	1,673,461
France	18,998	38,792
Austrian Territories	42,327	215,108
Turkey, Wallachia, and Moldavia	305,379	927,072
Egypt	95,550	140,940
United States	7,244,705	7,063,994
Chili	277,697	288,001
British North America	978,832	1,166,348
Other Countries	103,713	353,047
Total	16,721,997	19,386,678

VALUE.

Russia	£2,380,412	£4,261,349
Denmark	105,927	20,531
Germany	1,275,411	1,099,789
France	9,506	21,494
Austrian Territories	19,304	135,842
Turkey, Wallachia, and Moldavia	132,860	478,532
Egypt	40,702	78,152
United States	3,767,222	4,231,894
Chili	165,097	184,660
British North America	530,487	671,599
Other Countries	51,114	219,843
Total	£8,478,042	£11,403,685

QUANTITIES.

	Seven Months ended July 31, 1870.	Seven Months ended July 31, 1871.
	Cwt.	Cwt.
Barley.....	4,438,414	3,935,290
Oats	5,727,828	5,484,669
Peas	1,166,589	565,535
Beans	902,213	1,368,066
Indian corn ...	8,026,404	7,625,487

VALUE.

Barley.....	£1,735,022	£1,576,339
Oats	2,250,111	2,018,631
Peas	477,775	249,255
Beans	377,026	614,798
Indian corn ...	2,722,873	2,983,019

QUANTITIES.

	Seven Months ended July 31, 1870.	Seven Months ended July 31, 1871.
Wheat Meal and Flour.	Cwt.	Cwt.
Germany	653,818	543,507
France	577,039	2,254
United States	1,256,648	1,287,184
British North America	108,930	151,995
Other Countries	242,958	471,338
Total	2,839,393	2,456,278

VALUE.

Germany	£447,613	£506,283
France	410,807	1,674
United States	814,028	979,893
British North America	77,381	111,905
Other Countries	167,349	455,839
Total	£1,917,178	£2,055,594

The supply of guano during the month was much smaller than in July of 1870; but, in the seven months, the quantity received came within about 3000 tons of the total up to the end of July last year. The amount we paid for the seven months' discharges was £1,637,451; last year, in the same time, we paid £1,763,251. Bones, likewise, were in smaller demand during the month, although an increase is noticeable on the longer period to which the Returns apply. The cost of these artificial fertilizers, for the seven months that have expired, was £325,153; last year, up to the same time, they only cost £273,853.

Eggs, in which for some months there was a falling off, owing to the war on the Continent, are now coming in more plentifully, the number received last month, in "great hundreds," being 328,279, to compare with 311,846 in the same month of last year. In the seven months, however, the numbers were smaller, and we should like to see them smaller still, being in the belief that a million and a-half of money per year is too much to pay to Continentals for our breakfast luxuries.

The receipt of hops last month was very heavy, reaching 31,324 cwt., as against 904 in July of last year, the cost being £85,388, to contrast with £2545.

In oilseed cakes the increase during the month was a-third over last July, and on the seven months there was an increase of over a-fifth. We paid for this commodity for our cattle during the seven months £899,798, last year, up to the same date, only £702,145.

To the value of animal food, which we have given above, should be added "unenumerated meat" (it is a pity that the Returns do not bring kindred subjects closer together than they are printed), which salted, fresh, and preserved meat, cost nearly £350,000.

Potatoes were in less request both in the month and seven months, costing this year only £119,711, as against £221,282 in the same time last year.

We had double the quantity of wool in the month that we had in July 1870, and over the seven months there is a large increase, as the following figures shew:—

QUANTITIES.

	Seven Months ending July 31, 1870.	Seven Months ending July 30, 1871.
Wool, Sheep, and Lambs.	lb.	lb.
From Countries in Europe	8,713,321	18,747,931
,, British Possessions in South Africa ...	15,931,481	19,500,215
,, British India	4,719,602	13,677,526
,, Australia	145,892,915	159,840,104
,, Other Countries	9,582,581	18,251,904
Total	184,839,900	230,116,680

	VALUE.	
From Countries in Europe	£472,459	£986,636
,, British Possessions in South Africa ...	1,038,783	1,004,411
,, British India	149,302	471,039
,, Australia	9,249,206	9,321,166
,, Other Countries.....	297,621	659,059
Total	£11,207,371	£12,442,311

Turning now to the credit side of the account, we find very little alteration in the quantities of home-made butter and cheese exported. For butter, there was a little more demand; for cheese, slightly less. The amount received for butter was £184,866, and for cheese, £54,369, as compared with £160,204 and £59,655.

France still continues to be a good customer for horses. It must be some time yet before she can make up all the losses in horse flesh occasioned by the war. Last month, France took 520 animals from us, as against 417 in the corresponding month of last year: "other countries" only took 52, as against 460. As "other countries," to a great extent, mean Germany, it would appear that Germans were more prescient than the French last year, and this year less needful. The total number of horses exported during the year, up to the end of July, was 4988—4104 of which went to France. The amount realized for the lot was £178,711; last year at the same time only £79,936. Home-grown wool was in more demand on the Continent—about 1,500,000 lb. more having been exported in the seven months. Germany and Holland were our best customers, as the following figures tell:—

	QUANTITIES.	
	Seven Months ended July 31, 1870.	Seven Months ended July 31, 1871.
Wool, Sheep, and Lambs.	lb.	lb.
To Germany	622,170	1,557,900
,, Belgium	821,435	2,075,372
,, France.....	2,629,667	1,466,613
,, United States	517,583	656,536
,, Other Countries ...	630,601	988,696
Total	5,221,456	6,745,118
	VALUE.	
To Germany	£45,994	£110,706
,, Belgium	53,919	127,948
,, France.....	176,543	121,607
,, United States	19,565	35,629
,, Other Countries ...	43,086	75,361
Total	£339,107	£471,251

PRODUCING HAY FOR MARKET.

WE copy the following very sensible article from the *Albany Country Gentleman*, from the pen of Mr W. Brown, Rockingham County. It has been considered by many a ruinous business to sell hay from the farm, and in the common acceptation of the term, such is the case. Some farms are not adapted to grass culture, being dry and poor, fit only for tillage, or to grow wood. In this case, it would be unwise to attempt grass culture. On such farms it would be poor policy to remove the scanty crop grown. Yet there are lands which are by nature adapted to grass, and with a system of culture looking to that end, will produce good crops for an indefinite length of time. The cities, towns, and villages which are annually requiring an increased quantity for consumption, are obliged to go farther each year to obtain the needed supply I have known, in years of scarcity, hay drawn 60 miles by horses to the Boston market. Moving hay 40 or 50 miles is a thing of everyday occurrence; and those who have lands well adapted to grass in this section, do nothing more profitable than producing hay for the market. The area of planted land is becoming less each year, the high price of labour having caused many to raise only just enough of the hoed crops for family use; the great improvements in hay harvesting machinery have been conducive of this

result. It requires a different course of management where hay is raised exclusively, from that where a more mixed system prevails. In order to produce hay successfully, grass land is needed. It is no use to try to subvert the laws of nature in the growth of plants. Grass on dry hillside or sandy plains is as much out of place as corn or potatoes on wet low land.

PLOUGHING, MANURING, AND SOWING.

No small part of a farmer's success depends on the fitness of the soil for the crops he wishes to cultivate. For grass, a moist soil, capable of withstanding drought, is as favourable a condition as we can have. The old method of manuring and cultivating hoed crops for one or two years, and then laying down with grain and grass seeds, in many instances laying down in poorer condition than when taken up, is rapidly going out of practice. The land is turned over, the manure applied to the surface and harrowed in, the seed sown and rolled in. All the benefit of the manure and the decaying turf, with the mechanical condition produced by the plough, go directly for the benefit of the grass, without the exhaustive effects produced by the hoed and grain crops as by the former custom. The manure should be applied to the surface and harrowed in, as it is then in the best position to be readily taken up by the roots. The action of rain does not leach it below the soil penetrated by the roots. Manure, ploughed in for grass is too low down to produce the best result. Experience has proved that manure is double in value for grass applied near the surface, to that ploughed under, yet it is not an uncommon thing to see those calling themselves good farmers, ploughing in manure for grass. Some plough immediately after haying, and seed in August or early in September. Sown at this time, the young grass becomes strong enough to withstand the winter, and a good crop is produced the succeeding season. Others sow just as the ground closes up for the season. The seed does not germinate until spring. Early in March, or as soon as the snow has disappeared, is a favourite time with others. In either of the latter cases, a full crop is not produced the first season. I am favourable to the early spring sowing, having succeeded in getting a good catch and heavy crops from high land. where formerly a grain crop was considered indispensable in successful laying down to grass. I have found but little difficulty in sowing at any season of the year, if the land was in good condition, and the weather not too dry until the grass had become established. To grow hay successfully for the market, good crops and of the best quality should be produced—a good article always commands a good price and a ready sale. Wet lands should be drained enough to kill out all water vegetation; when this is done it usually becomes the most productive land. Where the hay is mostly sold, some provision must be made for manure to keep up the fertility, either by purchase or manufacture. Those who live near towns, and can purchase stable manure at a fair price, find it profitable to do so. One of our good farmers informed me that 1 ton of hay fed out on his farm would produce a cord of manure; 1 ton of hay sold would deliver three cords of manure at his farm; in this case he can well afford to sell hay. Ashes, both leached and unleached, are used with good success; guano and superphosphate are used, and in some instances have proved valuable. Whether manure is purchased or not, the home manufacture should not be neglected. Some stock must of necessity be kept—teams, cows, &c. The coarse fodder meadow and salt hay is fed out with grain, and where the manure is kept under cover, supplied with absorbents, quite an amount is made. Some feed grain purchased to fattening animals, and in this way produce very rich manure, which may be spread much thinner and produce better results than a much heavier coat of manure such as is usually made on the majority of farms. One great help, in my judgment, to improved and profitable agriculture, would be the production of richer manure. As it is of the same nature of the food from which it is produced,

we must rate the manure from animals fed on meadow hay much less in value from that produced from grain; the extra cost of moving and applying four loads which contain only as much enriching matter as might be produced in one, is an object in the present exceedingly high price of manure and team labour.

CAREFUL SUPERINTENDENCE: VARIETIES.

When a field begins to fail, we have found it better to plough, manure, and re-seed, than to apply manure to the surface, as is customary in some places. The hay will be of much better quality on new land. If it should be desirable to top-dress on the grass, it should be done soon after the crop is taken off, with fine manure, and well incorporated among the roots with the brush harrow. Coarse manure does little good, and is much in the way of the scythe. The allowing of animals to feed and tramp upon mowing fields is a very poor practice, and one which tends to impoverishment in a short time. It is better to mow off and remove any grass which may be too heavy to remain. Animals usually leave that which is most desirable to get rid of, and go for the young and tender grass which stands most in need of protection. Timothy and red-top are the kinds usually sown, and if spring sowing is practised, clover is added, and this is a strong argument in favour of spring sowing; the deep roots of the clover penetrate the soil and mellow the land for the aftergrowth, as it draws much of its sustenance from the atmosphere. It does not damage the after-crops. From 12 quarts to ½ a bushel of Timothy, 1 bushel of red-top, and from 6 to 12 lb. of clover, are sown to the acre. After the second year, the clover usually disappears, and the Timothy and red-top occupy the land. The red-top makes the hay weigh heavier, and the mixture gives better satisfaction in the market. Where the land is in good condition, 2 tons actual weight, to the acre is a good crop, and may be expected regularly for a number of years. By pursuing a proper course of manuring, the raising of hay for the market may become a legitimate and profitable business, and much more leisure enjoyed than in a more mixed system of agriculture.

HEAVY GROWTH A PROTECTION AGAINST DROUGHT.

UNDER this heading, the *Albany Country Gentleman* has an article from a correspondent, "F. J.," which is worthy of consideration. At the time of his writing, the weather was very hot, and there had been a want of moisture for weeks. Grass and the early sown grain, he informs us, was suffering much. There was, he remarks, a piece of clover which was part of a garden. It was, he continues, sown thick (a year ago), and the stand, therefore, is the same. In walking over it, it feels soft and springy like a mat, and it is with some difficulty that you can get to the ground. The point here is, that this dense covering is a protection to the ground, acting as a bar to the escape of moisture, and probably also to the fertilizing grasses.

Walk here, with the sun directly upon you—heat almost insufferable—and your feet will be cool—almost moist; there is moisture in this thick mat of grass. The leaves are not shrunken as is the case elsewhere. This tells. The sun blisters the ground in the thinly-seeded fields, and the few spires are almost dwindled away, giving the land a barren and scorched appearance.

The difference between these fields is so marked that it becomes a contrast—a dense, fresh growth on the one hand, and a scorched, withered appearance on the other. The one is a growth that will cut in a few weeks 3 tons to the acre; with good growing weather, the other, at the best, will not realize a-third; a few pieces here and there may do a little better. But the drought has the start;

evil is inflicted, and the present season there is no remedy.

It is the heavy growth, then, that protects itself; not the length of the stem, but the thickness, the closeness of the stand, preventting the sun from anything like reaching the ground. This early, as now—for the growth of clover is early and rapid—and it needs but a little lifting, and the *thick-set* will do the rest, and it is this which does it, let it be understood.

The orchard grass is named so because it grows well in an orchard, that is, in the shade, which means moisture. That is what this plant requires—and it thrives only under moist conditions. Hence it is tenacious of orchards, but will run out in the open field where it does less well save when the season is a wet one; then it will thrive abundantly, surpassing probably all other grasses. And yet it is considered to stand the drought. This is because it forms such a dense growth, even more so than clover, where the crop is a close one. This is necessary to ensure this growth in a drought.

There is a clover field of 7 acres near by. 3 pecks of seed, half clover and half Timothy, were sown to the acre. The land was rich and mellow, and the catch accordingly. There is already sufficient growth for a fair crop, more than an average—and yet the growth of grass, it may be said, has but fairly commenced, thus early in the season. Now, all the drought that may occur between now and the middle of June will not prevent a a good, a superior crop, say of 3 or very nearly 3 tons to the acre. Were the growth but a scattered one, with but little seed sown to the acre, how would it be then? As we see in other places.

There is much clover raised here. Last year, in all the drought, and the long persistent heat, there were fields that turned out large crops. They occupied the ground at once, early in the season, and they retained the advantage till harvest. Thus three crops have been raised, the last, the aftermath, left for the winter; and now they are covered again (with clover), not so dense, but black and long in the growth, and occupying the ground; this is the third year. In some cases the clover has been winter-killed or run out to a certain extent, and the Timothy is shewing in its place; but the crop will be a light one; this on soil that is rich, but generally not very dry, shewing the importance of ditching.

Now, if it is indeed true that a heavy growth is a protection in a drought, here is a new and a strong inducement to secure it, to put the land in a proper condition. Like the man of ten talents, to whom more was given because he had more, so the crop will increase the more because it has the more.

It is held that heavy crops evaporate moisture all the more. This is true. But much of this moisture is retained by the heavy mass "entangled in its folds," so that the escape, actual escape, from the grass as a body, is considerably less, in proportion, than that set free by the more scattered growth. Here the air drinks rapidly from the slim plants exposed fully to it, and carries off what it takes. In the dense mass it cannot do this; it cannot penetrate it.

But the greatest harm in a drought is, the direct exposure of the soil to the sun and the hot, *dry* wind. This, indeed, is the cause, more or less, of all drought. What is the evaporation of plants compared to this? Well, this is avoided, wholly avoided, in a dense mass of verdure. It needs but a start to occupy and cover in time, as now. The contrast is interesting—a cloud on the one hand, barrenness on the other."

SOILING CATTLE.

THE advantages of soiling over pasturing cattle are thus concisely summed up by Josiah Quincy:—

1. The saving of land.
2. The saving of fences.
3. The economizing of food.
4. The better condition and greater comfort of the cattle.
5. The greater product of milk.
6. The attainment of a greater quantity of manure, of improved quality.

In regard to the crops best adapted for the purpose, their succession, and the time of sowing, the same authority gives the following directions as suitable for the latitude of Boston and any similar climate:—

1. As early in April as the state of the land will permit, which is usually between the 5th and 10th, on properly prepared land, oats at the rate of 4 bushels to the acre.
2. About the 20th of the same month, sow either oats or barley, at the same rate per acre.
3. Early in May, sow in like manner either of the above grains.
4. Between the 10th and 15th of May sow Indian corn, the flat Southern being the best, in drills, 3 bushels to the acre.
5. About the 25th of May, sow corn again in like proportions.
6. About the 5th of June, repeat the sowing of corn.
7. After the above-mentioned sowing, barley should be sown on the 15th and 25th of June and early in July, barley being the best qualified to resist the early frosts.

The first sown will be in a state to be used about the first of July, until which time grass cut and brought to the stable is the reliance.

As soon as the first sowing is fed off, Mr Quincy recommends that the land be well manured and ploughed, and again sowed with seed, pursuing this practice with all the land from which fodder has been removed in time for a new crop to be grown, which can only be in cases of early sowing.

As to the quantity of land to be cultivated, it is stated that a square rod of rich loam in grass, oats, or barley, is enough to support one cow a day, if cut and fed to her in the barn. But his practice has been to cultivate 1½ square rods for each head, as the season may not be favourable. If there should be a greater growth than is consumed in the green state, it would not be lost, as it may be cured for winter use.

UTILIZATION OF WATER FOR FARM WORK.

THE *Banffshire Journal* gives an interesting account of the application of water power to farm machinery in the north, which might be adopted with advantage in other localities. Our contemporary says:—

The farm of Pullo, situated in the parish of Meldrum, is about 300 acres in extent, and the steading is situated in an elevated position, a portion of the land having a gentle slope to the south. At the southern extremity of the farm there is a deep ravine, with a small stream running down the bottom of it. Mr John Ross, the occupant of the farm, wished to supersede the use of horse power in driving the machinery at the steading, and the stream we have referred to being

the only available source of water, he set to work with the view of devising a plan of bringing its motive power to bear on the machinery. His labours resulted in the adoption of a system which, so far as could be ascertained, has no parallel in this country, the only approximation to it existing in Switzerland. The system is simply the erection of a water-wheel at the side of the stream, and the carrying of the power to the machinery by means of wire ropes and pulleys. For the practical execution of the plan, Mr Ross called in the services of Mr William Dow, millwright, Claymires, Ellon, and he accomplished the work in the most successful and satisfactory manner.

The stream in the ravine, at the southern extremity of the farm, runs from west to east, and the water is collected in a large dam, from which it flows by a level run a distance of about 50 yards to the water wheel. The wheel is fixed on stone and lime foundations, built parallel with the bed of the stream. The overshot water wheel is 13 feet diameter, and 3 feet 9 inches broad; and there is attached to the shaft an iron wheel 6 feet diameter, which gives motion to the whole gearing employed. The peculiarities of the situation necessitated the posture of the water wheel being from west to east, and there were some difficulties to overcome in setting the pulley for the wire rope to run in a direct line nearly from south to north. For this purpose three small shafts, with bevelled pinions and wheels, had to be employed, the third shaft bearing the pulley upon which the wire rope works.

From the bottom to the top of the ravine there is a nearly perpendicular height of 40 feet. At the top of the ravine there is erected a wooden frame as a support for the wires. The frame consists of a couple of strong upright posts fixed into the ground, strengthened at the base by a couple of cross beams, and having a beam resting on their tops. The height of the frame is 23 feet above the level of the ground. Into this frame is fitted a sliding case containing an axle and couple of pulleys, the axle being stationary, and the pulley disconnected so as to run in opposite directions. From the top of the sliding case, chains run up the inside of the frame posts, cross the top of the posts upon a couple of pulleys, and hang on the outside with weights suspended at them. When the wire rope is carried across the pulleys in the outside case, the weights at the end of the chains outside the frame posts are adjusted so that they pull up the case and tighten the wire rope. Thus, after the wire rope is fitted up, supposing it to stretch, or to be subjected to any unusual pressure, this self-acting apparatus would in the one case tighten up the slack, and in the other yield to the pressure and prevent breakage; and by means of it the rope is always kept at an equal tension. The weight necessary to effect this purpose is something less than the weight of the rope.

At about equal distances—say 80 yards apart—between this frame on the brink of the ravine and the thrashing mill, there are two other frames for supporting the wire rope, and where it terminates in a circuit, and at the same time transmits the power to another circuit of rope, the last circuit of rope going directly into the barn and giving motion to the machinery. The two intermediate frames are composed of a couple of poles in the form of the letter A, their base resting loosely upon stones, and with a double-grooved pulley fixed between them at the top. These frames are about 18 feet in height. One circuit of ropes runs in one groove of the pulley, drawing the frame in one direction; while the other circuit of rope runs in the second groove of the pulley, drawing the frame in the opposite direction. Between these two opposing forces the frame is balanced, and yet moves to and fro to suit the tension of the rope on either side of it, and to allow the sliding case at the brink of the ravine to tighten or slacken the rope upon expansion or pressure at any point along the course of any of its circuits.

Over the distance of about 300 yards from the water wheel to the thrashing mill, there are three circuits of rope. The first circuit runs from the pulley at the water wheel, over the two pulleys on the adjusting frame (one pulley having a forward and the other a

vard motion), to the first support about rds beyond, where it turns upon one of rooves of the pulley. The second cir- xtends between the two supports; and ird circuit from the second support to op of the barn, above the thrashing mill, e a pulley is fixed. In order to bring ower to bear on the proper line for the hing mill, bevel-gearing was required n the barn. A cast-iron frame was ; the pulley bringing the power from ut was fixed upon one end of the frame, two small shafts were introduced, from of which, by means of a belt, the power mmunicated to the thrashing mill. The has simply the advantage of keeping elative parts of the gear true to each

good many experiments were made e determining upon the thickness of and size of the pulleys. The rope used de of steel wire. In the centre there is ll hemp cord, covered by four strands, strand consisting of six small wires. The is as nearly as possible a ¼-inch in eter, and, we may note, was supplied by rs James Glover & Co., St Helens. Pre- ory to being used, it was coated with a re of tar and palm oil, the oil prevent- ie tar from clogging in the grooves of ulleys. The wire rope is very flexible, was found that to obtain a minimum ction and liability to breakage from the ness of the curve, a pulley of 3 to 4 liameter was requisite. The pulley ed was 4 feet diameter, and it has been to work without causing the slightest ge to the rope. The pulleys require turned, and are about the most ex- ve item in the undertaking—those used g been made by Messrs Richard Walker ther, Bury. It has been ascertained in esent case that the power will be carried ut any appreciable loss for a distance of mile by these ropes and pulleys. The however, must always be placed in a ht line; when any corner is to be l, gearing must be erected to alter the ion of the motion, which can be done, his case, by the use of bevel wheels. gearing embraces an agency for the letting off and on the water, and for the stoppage of the water wheel without interrupting the flow from the dam. From small cranks by the side of the thrashing mill, a single wire is carried along the whole line to the water course, resting upon the top of the wooden supporting frames. By a turn of the crank in the barn, the sluice is lifted, and the water let off the dam just as easily as if one were working the crank at the sluice; and by a turn of another crank, a door in the water spout is let down, and the water has access to set the wheel in motion. When we saw the mill at work thrashing oats, the outflow of water required to drive it at full speed did not half fill the wheel buckets. The whole gearing works noiselessly, and the vibration upon the running rope was on two of the sections imperceptible, and on the other, for a few minutes after starting, only about 2 or 3 inches. As an indication of the speed acquired, we may mention that the drum of the thrashing mill, which is 3 feet diameter, was going at the rate of 380 revolutions, equal to travelling 1140 yards in a minute. The pulleys run at half the speed of the drum of the thrashing mill, so that the velocity is by no means excessive. The gear has been in use since April, and there is no indication of wear on the rope.

The cost of the undertaking has, in this case, where the way had to be felt, and some special castings made, been greater than it would be were the work to be done with the experience now acquired. An estimate of the cost of the gearing need only be given, exclusive of the cost of the wheel and intermediate motions, which in each case would vary with the situation. The wire ropes and pulleys in this case cost at the rate of £10 per 100 yards.

Besides driving the thrashing mill, the gearing has been connected with a corn bruiser and turnip cutter, and is regularly set to work when these machines are in use. Indeed, the gearing works so simply and satisfactorily that very little outlay beyond the mere cost of anchors, with pulleys and wire rope, would suffice for the application of the water power through it to the cultivation of the fields.

TOWN SEWAGE.

WE copy from the *Nottinghamshire Guardian*, the following concerning town sewage. The question is one of the utmost importance—none the less important that it is not making much headway. The time will come, however, when public weal and profit will result from the utilization of the refuse of cities and villages.

"At last this vexed question is assuming a definite form, and, thanks to the pressure which Earl Manvers, through his agent, Mr Beaumont, is putting upon us, it is likely that we shall continue in the way of well-doing, until one of these fine days, two or three years hence, the Leen may regain its wonted purity, and the sewage of the town be used for the weal instead of for the woe of those who have to draw their water supply from the Trent, after it has received the filth from the town. The report of the committee is such as might be expected from thinking pains-taking men, and the conclusion they have arrived at in accordance with the experience of the leading scientific and agricultural authorities. Coming from the land, there is no place so fully entitled to receive the sewage as the land, and so long as the fluid is found to be the richest part ot sewage, so long must irrigation be found the best method of utilizing it. The earth is the great natural deodoriser; and it matters not what fetid substance you commit to its keeping, it immediately becomes sweet, and if at the same time the earth be covered with a growing crop, the sweetening process is so much more rapid. These are demonstrative facts which any person may prove for himself, and the filtering power of the earth needs no closer examination than the effluent water of the drains, from which rank sewage will pass pure as the mountain stream. What has become of the colouring, and possibly putrid matter? It has been absorbed first by the soil and then by the plants which grow upon it, and what was once animal or vegetable matter is in a fair way to regain its original form. The sheep and the cattle fold are looked to with a jealousy which the farmer knows is for his own interest; the contents of the manfold, which are so much more valuable, have been allowed to accumulate, until, in thousands of cases, they have become a source of pestilence, instead of profit; and when that has been discovered, we have made drains to convey the offensive matter from our midst, to be again a nuisance to those resident at the outlet of the drain. A system like this could not be expected to prevail for many years—self-preservation forbids that it should; and hence, where corporations or committees have not had the wisdom to take the initiative, the law has stepped in and compelled them to help themselves. For the disposal of sewage we have had, and have now, many schemes, but not one which appeals so directly to the interests of mankind, as sending it directly to the land. The result of that process is such as to be satisfactory to every one who has the knowledge to interpret Nature's secrets in a proper spirit and to use them aright. Those who have gone into the sewage question with spirit, have succeeded in educing profit; those who have approached it with a sort of half-hearted determination to say it cannot, or shall not succeed, have reaped their reward. It is singular, however, that Nottingham should be so backward in this movement, for certainly the county possesses a sewage farm, which, during the last forty years, has produced more beef and mutton than any farm of like size in the country, and that, too, when originally taken in hand only a poor blow-away sand. We need scarcely say that we allude to Clipston Park, the water meadows of the Duke of Portland, which owe their luxuriance almost entirely to the sewage of the town of Mansfield. This has been going on for forty years to our

ledge, and yet we do not suppose any ever heard of diseased meat emanating the farm, nor are they likely to do so. ing of diseased meat, "measley" pork much more prevalent in our market years ago than it is at the present time, that, be it observed, originating animals not feeding from sewage ice. We can quite believe that the ses spoken of might originate upon ge-saturated ground; but, at the same we say, where are there proofs that have done so? Fancies are rife, but facts stand forth to support them, we is well regard them as the presage of a which may never approach us. So far ve no proof of injury, but, on the con- we have the incontrovertible fact that ands of tons of sewage produce is daily converted into food for the human y, and that upon land formerly con- d worthless. Facts like these should the opponents of the irrigation system use in their opposition, for though in case, especially where land is to be red at an exorbitant price, it may not ssible to make sewage farming profitable t, it must be remembered, is the result e condition of tenure, and not of the n of farming. That some of our town illors should have gone out of their o re-hash exploded theories, is quite in dance with the nature of things; and thers should see danger in the use of ge is not to be wondered at. The ity of mankind are greater at fault-find- an in discovering perfection, and hence rivilege of the grumbler is more largely sed than that of the philosopher. Many r most potent and valuable medicines nk poison; properly used, they become tes to most of the "ills that flesh is heir to." Much the same is it with sewage manure—that is, it requires to be used with "brains," for to send it broadcast over the land would be something like sowing the wind in order to reap the whirlwind. Sewage in a dripping season may be so poor as to be used week by week without injury to the crop; in dry weather, so rich, as, used in excess, to become a positive poison to vegetable life. To discriminate the potency of the sewage, then, becomes the secret of successful management—knowledge requiring careful forethought and accurate observation. A man who does not possess this, who, in fact, is not *en rapport* at all times with the plants he cultivates, will not succeed as a sewage farmer. A few tons extra of farmyard manure may be put upon the land without injury; but an extra hour's irrigation with the sewage at a certain strength, may be ruin to the entire crop for that season. Here, then, is the danger of sewage irrigation—the danger of abuse, or rather of ignorant use. To guard against this, then, is the secret of success, and those who expect to succeed in sewage farming by rule of thumb, are almost sure to fail. Of this we become daily more convinced, and if the problem could be worked out, it is more than likely it would be found that more sewage farms have failed from incompetent management than from any positive defect in the system itself. Gardeners know full well the immediate consequence of the abuse of liquid manure, they know that to the unhealthy plant it is death, and that to healthy ones it must be used with caution. Equally so will it be with farm crops, and until the farmer is able to realize that fact, his success must be to a great extent a matter of chance. Educate him up to the proper standard, and success becomes certain."

SHEEP-KILLING DOGS.

PRETTY much the whole canine fraternity may be classed as "sheep-killing dogs." It runs in the blood back to the first dog, whether we locate him in the Mosaic creation, or clear back in protoplasm. We have no doubt the first dog was born with his teeth at a sheep's neck, sucking blood several days before he took to his mother's milk. We do not know how else to account for the blood-thirstiness of dogs, and their *penchant* for sheep's blood in particular, upon any other hypothesis. Of course no man's dog in particular has this propensity, and of course your own dog never kills sheep. We never found a dog owner that would acknowledge his cur guilty, unless two men were ready to swear that they caught him in the act, and then it is always the first offence, though hundreds of sheep have been mangled and killed in the neighbourhood. The old rule of presumed innocence will not do in this case. It is to be presumed that every dog, no matter what his breed, size, or training, is a born sheep-killer. We lately caught a trained pointer, whose acquaintance was presumed to be mainly with birds, in the act of running down a sheep. All his associations had been clear of sheep, and he looked as innocent as a lamb; and yet the moment he got sight of a flock, he pitched into them as if he had been trained to the smell of wool and nothing else. This instinct for sheep's blood is absolutely uncontrollable, and we may as well face this fact at once, and base our legislation upon it. Even here, in Connecticut, where we have laws, and attempt to regulate animal instincts, and to some extent mete out justice between man and man, dogs numbered and heavily taxed, kill sheep, and farmers get only a partial compensation for their losses. If the dog tax meets these losses, well and good; if not, the farmers suffer. This, of course, operates disastrously upon sheep-raising, one of the most profitable branches of husbandry in the eastern states. It is especially discouraging to investments in thoroughbred animals. Cotswolds, with good pedigrees, are worth 100 dols. each. Ten of these animals cost a farmer 1000 dols. It would be a very small job for a dog, not worth ten cents for any purpose but the manure heap, to destroy all this property in one night. It is a smart agricultural town that collects the tax on five hundred dogs, and gets 1000 dols. into its treasury. Few men can afford to run the risk of putting so much money into stock that is made so insecure. Dogs are the great hindrance to the extension of sheep culture. We want a radical change in the character of our legislation. The law should persume that the whole race is guilty, and not only tax dog owners, but make them responsible for every sheep killed by dogs in the town. If I keep no dog, there is no sense in taxing me for what my neighbour destroys by his vicious taste. If there are but ten men in town that wish to indulge in this luxury, let them give bonds to pay the damage done by their curs. Let them be compelled to keep their dogs muzzled or caged, as they would wolves. We would not have any man's freedom interfered with in any way. He may keep rattlesnakes, if its suits his fancy, but he should not keep them on the highway, or in his neighbour's pasture. Dogs are much more dangerous to man and beast than serpents.—*Connecticut, in Hearth and Home.*

THE FARM KITCHEN.

'E are indebted for the following interesting article to the *Aberdeen Press*:—

e of the most frequently recurring, and ast important of social questions in gion, is that which concerns the moral ter and physical accommodation of ltural labourers. The prominent phase which the question has of late found vhat hopeful discussion, has been that e Feeing Market system, as opposed to e rational and commendable mode of ıg engagements between employers and)yed. The movement in this direction, is now supported by the influence of oyal Northern Agricultural Society, will, ust, prove increasingly successful; but)roblem, like every problem affecting relfare of an entire class in society, is a lex one; and the evil to be uprooted to be assailed, not at one point, but at points.

d in any comprehensive view of the ion, it is impossible to overlook the stic arrangements of the farm. The iling system in this particular is un-ionably chargeable with serious defects, ıer we have regard to the paucity of accommodation for married agricul-labourers in most localities of Aberdeen-or to the nature of the accommodation ded for the young unmarried men, who ıdispensable on every farm. We have tention at present of making any further ınce to the first of these two points; hall we, in offering a suggestion anent atter, institute any kind of comparison en the bothy, pure and simple, and the kitchen, further than to say that while ormer is certainly not the best con-ble arrangement, it may, under proper ations, be made much more satisfactory moral point of view than many an ill ıted farm kitchen is at this day.

The suggestion, for which we are indebted to a very intelligent friend who has had ample opportunities of seeing farm life in all its phases, bears chiefly upon the better ordering of the farm kitchen. A radical evil in the existing system where several un-married men, ploughmen, and others, live on the farm is, that while the kitchen is the place where the female servants must not only do the cooking, but much other do-mestic work, it is also the place where the male servants both eat their food and spend such leisure time as they have thereafter in the evening, and at other times. As a con-sequence, they come, perforce, in the way of the female servants doing their work. Some-times, it may be, the two parties go on harmoniously enough—pretty frequently it is the reverse. In any case, the men feel that the place in which they pass so much of their spare time is not their own, nor at their own control; and this feeling fosters the desire to escape elsewhere—to potter about in the "cham'er" perhaps, or quite as likely, to "stravaige" from home. On the other hand, where the men servants are disposed to make themselves disagreeable, the arrangements of the kitchen put the female servants so much at their mercy as regards their own comfort, that the only way of getting on is to row in the same boat with the lads as regards the view they may take of their master or mistress' treatment of *them* — and that whether such view happens to be just and reasonable, or the very reverse. A very great improvement on the existing state of things, then, would be at once effected, if, in place of the present kitchen arrangement, as indicated, a very plainly furnished hall, with table, chairs, and fireplace, were built in con-nexion with the kitchens of all our larger farm houses. This hall would be recognized as the special and exclusive domain of the male servants, for the purpose of taking their

meals in, and spending their time after hours. There would thus be no excuse, as there ought to be no permission, for their entering the kitchen, without special cause. The arrangement would tend greatly to add to the comfort of the male servants; and it would be scarcely less a boon to the female domestics in carrying through their work and keeping the place orderly. The carrying out of it is, moreover, quite practicable, and indeed could be done, especially where new farm houses are being erected, at a very trifling additional cost—a cost which we are persuaded would be amply repaid in improved comfort and more pleasant service to those who might incur it.

Occasional Papers.

*THE WORLD BEFORE THE DELUGE.**

A GREAT many good stories are told about the deluge. One Celtic gentleman used to boast that one of his ancestors spoiled the flood by drinking all the water, in order, doubtless, to facilitate his matrimonial intentions towards Noah's daughter; and many distinguished families can prove that *their* ancestors "had boats of their own," and so did not condescend to enter the ark with its illustrious builder. It is not in a spirit of jocularity, however, that the subject of this Occasional Paper must be entered on. It is a subject on which much has been written, in some cases most ably, in many feebly —feebly because dogmatically. In page 405 of this book, there occurs the following sentence:—

"Nevertheless, we repeat, no explanation presents itself which can be considered conclusive; and in science, we should never be ashamed to say 'I do not know.' Although this is written with special reference to the Glacial period, it is applicable to the whole subject. Geology, we are told, in the opening chapter, 'explains to us the transformations which the earth has passed through, in order to arrive at its present condition.' Of all sciences, it is probably the most certain in its facts, though, perhaps, the most hypothetical in its inferences, 'and no wonder,' considering that the stratigraphical crust of the earth with which the geologist has to deal, may be some 10 miles thick, and that it has been deposited in distinct masses, in definite order, the dates or epochs of each formation may well be approached with great hesitation."

Yet it is on this science we must depend for our knowledge of "the world before the deluge." But which deluge? Our ideas of such an event are always in connexion with the Biblical account as described in Genesis, and Geology informs us there were two such previous to the appearance of man upon the earth. In order to explain the origin of the earth, and the cause of its various revolutions, geologists invoke three orders of facts, or fundamental considerations. 1. The hypothesis of the original incandescence of the globe; 2. The consideration of fossils; 3. The successive deposition of the sedimentary rocks.

As a corollary to these, the hypothesis of the upheaval of the earth's crust follows—upheaval having produced most of the local revolutions.

Such is the statement made. It does not seem unlikely that at a very early period of its history our globe existed as an intensely heated body in a fluid state (such fluidity being the result of igneous fusion), and this, it has been allowed, may be gathered from the general appearance of the Solar System. It would cool gradually at the surface, contracting as it cooled, and hardened. Thus, thin crusts might be formed, each shrinking. There would possibly be an uneven surface, with elevations and depressions, permitting the presence of water in a fluid state, reposing in the hollows, and forming seas, lakes, and oceans. No living being could now exist, at least, I presume not; for, as far as we know, neither animal nor vegetable could exist in a temperature of water actually boiling. Some small animalcules, I am aware, and even animals of higher organization, are capable of enjoying life at a temperature not much short of that.

The foregoing agrees, in some degree, with the hypothesis assigned in the chapter on "The Beginning" to La Place. Fig. 12 shews the difference between the earth in its present solid state and in its primitive gaseous mass. *A*, represents the former, *B* the latter. This chapter is exceedingly interesting. In fig. 1, is seen a representation of the earth circulating in space, in a gaseous state. The form is oval, but in obedience to law, liquid bodies assume a spherical form when in a state of rotation, and not only so, but as the result of centrifugal force, the globe, while liquid, became swollen at what we term the equator, and flattened at the poles. "To determine, even approximately, the time such a vast body would take in cooling so as to permit of the formation

* By Louis Figuier. London: Cassell, Petter, & Galpin.

of a solid crust, would be an impossible task. The first terrestrial crust would be incapable of resisting the waves of the ocean of internal fire, which would be depressed, and raised up at its daily flux and reflux, in obedience to the attraction of the sun and moon.

"Who can trace, even in imagination, the fearful rendings—who would dare to paint the horrors of these first mysterious convulsions of the globe?" Fig. 14 represents the formation of granite mountains, forced to the surface through an opening of the crust. Fig. 15 represents the formation of metallic veins; and fig. 16 the eruptions of granite. Again I quote—"Who would dare to paint the horrors of these first mysterious convulsions of the globe?"

The day came when water was triumphant; ocean was universal, and the earth thus cooled and settled. "Darkness brooded over the face of the earth, which was without form, and void," for no plant or animal could exist until light came; heat became abstracted, and rains purified the atmosphere, so that the sun's rays pierced the previous gloom, and "under their beneficent influence, life was not slow in disclosing itself—plants preceded animals.

The Silurian period, so named by Sir Roderick Impey Murchison, because the rocks which he deemed the most typical were more fully developed and "charged with peculiar organic remains," in the country of the Silures, who so bravely opposed the Roman invaders of their country, is the best determined period of the Primary Epoch.

Figs. 18 and 19, representing Trilobites, characterize this period: the organisms are rudimentary. Figs. 23, 24, 25, and 26, are given as illustrative of the Upper Silurian period. The first is coral; the two next are crustaceous, commonly called Seraphim by the Scotch quarymen.

Then came what is termed the Devonian or Old Red Sandstone period. Organisms now become more complex, but "vegetation is still simple in its development." Figs. 29 and 30 shew this.

Then we have the Carboniferous period, sub-divided into two, viz., that of *Carboniferous Limestone*, and the *Coal Measures*. The first of these gave rise to most important marine deposits, the second, to the great deposits of coal. Professor Phillips calculates that at the ordinary rate of progress, it would require 122,400 years to accumulate only 60 feet of coal.

For whose use was all this preparation? Not for a mere *development*, Mr Darwin? As yet no terrestrial animals existed—animal life being confined to the sea. "Rich vestments" of forest covered the earth, and hence the evidences of a strictly terrestrial flora.

The sea is losing its dominion over the drying land. Fig. 36 shews the arborescent and herbaceous ferns of the period; and 38 and 39 give an idea of the gigantic trees then growing; 58 and 59 are "microscopic animals, which can scarcely be said to have a distinct individual existence."

The Permian period is next. The Permian rocks have, of late years, assumed great interest, particularly in England, in consequence of the evidence their correct determination affords with regard to the probable extent, beneath them, of the coal-bearing strata, which they overlie and conceal.

The earth still continued to cool—both plants and animals were nearly the same as in the Carboniferous period. With this closes, geologically speaking, the First Epoch.

The Second Epoch, it has been agreed by geologists, to divide into three periods, (1.) The Triassic or new red period; (2.) The Jurassic, so called from the mountains of Jura in France; (3.) The Cretaceous.

Fig. 81 is that of a reptile. Fig. 82 represents the Voltzias, which seem to have formed the greater part of the forests in the first named.

The Jurassic period is subdivided into two sub-periods. The Lias and the Oolite oysters, scarcely known in the previous period, increased in the Lias, and the Belemnites, or Molluscous Cephalopods, of very curious organization, appear in great numbers. Fig. 91 will doubtless raise a question as to the propriety of naming this animal Ladies' Fingers.

Reptiles occupy a more important place in this than in any period, and the remains of the Ichthyosaurus, Plesiosaurus, and Plerodactyle, prove this. Dr Buckland describes the body of the first named, containing the remains of fishes which it had swallowed some "ten thousand of years ago, or a time even twice as great." The description of the form and habits of those animals is admirably given.

The most salient and characteristic feature of the Oolite period is undoubtedly the appearance of animals belonging to the class of Mammals. The first bird appeared now, and the curious remains are represented as discovered in fig. 121.

The name of Cretaceous is given to the next period, "because the rocks deposited by the sea, at its close, are almost entirely composed of

chalk (carbonate of lime). It will give a sufficient idea of the importance of the Cretaceous period to state that, in the rocks of the period, 268 genera of animals, hitherto unknown, and more than 5000 species of special living beings have been found—the thickness of the rocks being enormous. Where is the geologist who will venture to estimate the time occupied in creating and destroying the animated masses of which this is the cemetery?" The vegetation was at once exotic and temperate.

The ideal scenes of all the periods named in both epochs are well worthy of close examination, they well delineate the progress of the world until we come to the Tertiary period, when nearly all animal life is changed—evidently preparations were making for some great event —songsters make the wilderness resound; the woods flourish. The terrestrial crust has thickened, and the effects of central heat are no longer so severely felt—thus climate became more developed. "Continents and seas take their respective places, as we now see them, and the surface of the earth received its present form."

Then succeeds the Eocene period, and still animal and vegetable life advances. Then, again, the Miocene, where new creations of Mammals appear, among others, apes, bats, and dogs. The largest Mammal which ever lived is found as represented in fig. 160.

The products of the vegetable kingdom are, for the greater part, analogous to those of our own days, and lignites or imperfect coal have shewn us amber, in which fossil insects have been preserved in all their brilliant colouring and integrity of form. "Thus have been transmitted to us the delicate organisms of the earlier ages of the world."

The Pliocene period is marked by continual changes in the world's crust, still due to the gradual cooling of the globe; 212 species compose the rich and variegated flora of this period, and as the last period preceding our own epoch, the terrestial animals increase in number and size. Birds gave utterance to a more distinct and pleasing song amidst the solitude; and the sea for the first time, according to the evidence of the fauna of the period, produced marine mammals or cetacea. The ideal landscape, fig. 25 shews vegetation nearly identical with that of this day.

The last phase of the world's history is spoken of by geologists as the Quaternary Epoch, and is thus divided:—(1.) The European deluges; (2.) The Glacial period; (3.) The Creation of Man, and the subsequent Asiatic deluge.

The first European deluge occurred in the north of Europe, where it was produced by the upheaval of the mountains of Norway. Commencing in Scandinavia, the wave spread, and carried its ravages into those regions which now constitute Sweden, Norway, European Russia, and the north of Germany, sweeping before it all the loose soil on the surface, and covering the whole of Scandinavia—all the plains of Northern Europe—with a mantle of shifting soil. As the regions in the midst of which this great mountainous upheaval occurred—as the seas surrounding those vast spaces were partly frozen and covered with ice, from their elevation and neighbourhood to the pole—the wave which swept these countries carried along with it enormous masses of ice. The shock produced by the collision of these several solid blocks of frozen water would only contribute to increase the extent and intensity of the ravages occasioned by the violent cataclysm, which is represented in fig. 30.

The second European deluge is supposed to have been the result of the formation and upheaval of the Alps—caverns in which animal remains are found, attest this. They were evidently places of refuge for the beasts of the field. Sir Charles Lyell accounts for the existence of these caves, of which fig. 196 gives a good idea. Many have been the attempts made to explain the cause of the cataclysms just named, and the succeeding Glacial period. "We," says the book now before me, "need not hesitate to confess our ignorance of this strange, this mysterious episode in the history of the globe." The existence of the icy covering to the earth is fairly demonstrated. Our own island bears witness to the circumstance, and especially so in the Highlands of Scotland. "How shall we explain the Glacial period," is the question asked in the concluding paragraph in this chapter. The answer is as formerly mentioned. "I do not know." Quite right. "Who can by searching find out God?" The whole system which has been under consideration is *one*—it is the result of *one* mind, of *one* will, of *one* power. It is governed by laws which no power other than that which made them can interfere with.

Man is permitted to observe, to think; but at the very outset of his inquiries, as at the highest point to which his intelligence can reach, he is taught *humility*. Yet this is no reason why scientific inquiries should cease. It

is incumbent on man to use the faculties granted him, but, as he does so, at every step he will learn to express each thought with caution.

Do I speak of *man?* During this period no man existed, and it was only when the ice-covered earth resumed somewhat of its previous state, that he appeared. "Whence came he?" The antients never could satisfactorily account for his origin.

Plato imagined that he had degenerated from a loftier condition; an idea, singularly enough, which has been thought by some to have some similarity to that [entertained by many in our day respecting the first and second chapters of Genesis. In the twenty-seventh verse of the first chapter, we are told God created man in His own image. The second chapter begins, "Thus the heavens and the earth were finished, and all the hosts of them." On the seventh day, God rested and blessed that day, "because in it He had rested from all His work which God had created and made."

The fifth verse tells us there was not a man to till the ground, and *then* God formed him out of the dust of the ground, breathing into "his nostrils the breath of life, and man became a living soul."

I imagine that the two chapters should blend into one. My reading on this subject shews that the antients gave no countenance to what is now termed the Development theory. Prometheus is said to have made an image of a superior sort of clay, and then stole fire from the chariot of the sun—this was man—alas! Zeus, not to be undone, formed a beautiful virgin, named Pandora—from her, or from the box she mischievously opened, came all the ills flesh is heir to. This is the story of the appearance of man, the most similar to the Biblical account, and yet how immensely inferior. Truly the Bible is the bravest of books, and welcomes every advancement in science as giving additional evidence of its own veracity.

Chemical analysis proves that man's body is composed, in that inscrutable manner we term organization of nitrogen, carbon, hydrogen, oxygen, lime, iron, sulphur, phosphorus—all mineral substances in combination forming a large part of the solid earth. A soul wherewith to adore and thank the great Creator was vanted, and this, the last best gift was given. There are few more beautiful printed thoughts than are contained in the chapter on "The Creation of Man;"—that on "The Human Period," leads to no conclusion as to the antiquity of man. "We are without reliable data."

And now comes that which is commonly called "The Deluge"—that is, the Asiatic. This was caused by the upheaval of a long chain of mountains which are a prolongation of the Caucasus. It seems to be acknowledged that man was created on the banks of the Euphrates, in Western Asia. A railroad through the valley of this river will soon connect us with "utmost Ind."

An account of this deluge is to be found in the seventh chapter of Genesis. The expression "the earth," or "all the earth," as in the Vulgate, must not be supposed to mean the whole globe. It has been proved that "the Hebrew word *haarets* is often used in the sense of *region* or country, and that, in this instance, Moses used it to express only the part of the globe which was then peopled;" and similarly, *all the mountains* means the "highest mountains of the vast horizon." Many races preserve the traditions of this great event. Chaldeans, Hindoos, Ghebers, Chinese, all confirm the sacred record as to time and circumstance. I cannot close these notes better than by quoting largely from "The Epilogue." "Having considered the past history of the globe, we may now be permitted to bestow a glance upon the future which awaits it. Can the actual state of the earth be considered as definite?—the revolutions which have fashioned its surface, and produced the Alps in Europe, Mount Ararat in Asia, the Cordilleras in the New World—are they to be the last?"

The same causes which have already produced the cooling of the earth and its rugged crust, which is but "a small fraction compared to that of the internal liquid mass," still exist. Earthquakes and volcanic eruptions prove that there is danger of disruption. Yet, on the other hand, new lands, it is incontestable, are rising from the sea. It may be that "the actual condition of the soil, and the respective limits of sea and continents, have nothing fixed or definite in them;" and again another idea comes from this—Is our species to be perpetual? Is man "the image of His Maker," doomed to perish like other animals who have gone before, or is he to advance, so as to be like the angels of God?

"During the Metamorphic Epoch, the mineral kingdom existed alone; the rocks, silent and solitary, were all that was yet formed of the burning earth."

During the Primary Epoch, the vegetable kingdom, newly created, extended itself over the whole globe, which it soon covered from pole to pole, with an uninterrupted mass of verdure. During the Secondary and Tertiary Epochs, the

vegetable and animal kingdoms divided the earth between them.

In the Quaternary Epoch, the human kingdom appeared.

Is it, in the future destinies of our planet, to receive a new Lord? Is there to be a new kingdom created?

Truly all this is stated to be an impenetrable mystery.

Pliny writes—"*Latet in majestate naturae*," or, to speak more in the spirit of Christian philosophy, it is known only to the Almighty Creator of the world which formed the universe. I had intended to say something as to the much disputed question, respecting "the unity of the human race;" suffice it, that the greater number of eminent natural historians agree that "from one blood, God formed all nations of men, to dwell on the face of the earth."

It is good to know that science is but the handmaid to Biblical truth, and that as we progress in knowledge of the one, we become more and more convinced of the other.

It is wise to seek knowledge from its source: it is good to learn that human knowledge has its limit, just as our lives here have. It is not wrong to exercise our faculties in the endeavour to trace the wondrous foot-prints of creation; neither is it wrong to hope that in that new world to which allusion has been made, our intelligence and knowledge may be increased.

"O holy Hope! and high Humility!
High as the Heavens above!
These are your walks, and you have shewed them me
To kindle my cold love.

O Father of eternal life, and all
Created glories under Thee,
Resume thy spirit from this world of thrall
Into true liberty.

Either disperse these mists, which blot and fill
My perspective still, as they pass:
Or else remove me hence into that hill,
Where I shall need no glass.

O for the time when, in our seraph wings,
We veil our brows before the Eternal throne
The day when drinking knowledge at its springs,
We know as we are known."

DUN-EDIN.

Our Library Table.

On the Management of Sheep and Transit of Stock. By WILLIAM REID, Wool Broker, Granton, N.B. Edinburgh : William Nimmo and A. Elliot.

The author of this treatise, as he informs us in the preface to the work, has two objects in view—firstly, to shew that Great Britain is going backward as a wool-producing country; and secondly, that much food is wasted by imperfect means of transit. After carefully perusing the volume, we must confess that he has not only given us a most readable book, but a very instructive one on these points. Although Mr Reid traces the history of the animal from the days of Abel and gentle Rachel of Bible history, down to the present time, we shall not follow him in the earlier stages, but satisfy ourselves with a glance at what he says about the flocks of our own days, dividing, as the author does the long-woolled from their short-woolled brethren. He gives us a most interesting history of the Leicester, Lincoln, Cotswold, Romney Marsh, Blackfaced, and, last of all, the Lonk or mountain sheep of Yorkshire, which, however, he dismisses with a single sentence. He says, "It very much resembles the blackfaced, both as to hardiness and general features, and may yet be of great service in improving the blackfaced breed from the superior quality of its wool." With this we find no fault, but would add that it might also improve the size of the blackfaced, as it exceeds it in this respect, as much as in the length and quality of its wool. We believe the task has been tried by some of our northern graziers, but we are not aware with what success. Under the short-woolled sheep the author ranks first the Southdown, succeeded by the Welsh, or mountain sheep of Wales, famed for their wildness. Another Welsh breed, the "white nosed," as they are called, are of a tamer nature, and their wool forms the staple from which Welsh flannel is manufactured. The famous Cheviot breed receives a well-merited favourable description at the hands of Mr Reid, who concludes the histories of the different short-woolled sheep by an interesting account of the peculiar breeds of Orkney and Shetland, which our space forbids us giving.

The second part of Mr Reid's book, "On the Management of Sheep," displays careful consideration of the matter he writes about; and although we cannot agree with all his premises, we must grant that he has brought forward a host of evils resulting from improper management, such as over-stocking, improper selection of sires, insufficient heather burning, &c. We refer our readers very particularly to this part of the work, which conveys much information, that cannot fail to prove beneficial even to experienced stock-keepers.

The author's advice as to the proper mode of sheep-dipping, is of no little value, as his experience in this respect has been very considerable.

The third part of the work, on the "National Value of Sheep," is of a very useful character. There are no fewer than 34,000,000 of sheep in this country, which represents a capital sum of at least £30,000,000 —certainly a fact that proves their great value in the active economy of the country, and, if it were possible, as Mr Reid believes it to be, to double their numbers, we would not require to go so far as we now do to secure food and wool for our teeming population.

The last and not the least instructive chapter is that on the "Transit of Stock," to which we have frequently referred in our pages. It is a crying shame that railway companies have not been compelled to adopt the use of some such truck as that invented by the author, now under considerable use on the Continent as well as in America. Mr Reid's book is illustrated with a number of woodcuts of different varieties of sheep and machines for dipping sheep, as well as the patent waggon used on the Austrian railways.

In conclusion, we would now ask our readers to read this book for themselves, and although, like ourselves, they may not agree with Mr Reid in all he says, they will at least rise from its perusal, satisfied of the interest and importance of its contents. And it is to be hoped, that it will induce all who are interested in the prevention of cruelty to dumb animals—which really means more meat and wool—to make strenuous efforts to induce Parliament to insist that railway companies should supply better trucks for the transit of animals.

The Athlete and Athletic Almanack, 1871, Edited by Mr W. F. Wilkinson, of Amateur and London Athletic Clubs, Author of "Modern Athletics." Virtue & Co., London and New York.

A very notable feature in the present age is the rapid rise and progress of a taste for athletic exercises, and it is well it should be so, as a relief to the increase of the mental labour now prevalent. Apart from this, however, athletics develop a manly feeling of thought and action, they prevent undue attention to mere money-making, for it may be that, according to a recent joke of Mr Punch, we may yet cease to become a nation of shopkeepers and become one of soldiers, in which event such exercises will doubtless shew good results, especially when the soil

s little land has to be equally divided between or
: certain portions thereof appropriated to those
may rashly invade it.

book published in February of this year, entitled,
e Athlete and Athletic Almanack," now repro-
l after a year's interval, gives fair promise of
ying such information for the future as will of
give new impetus to the taste alluded to, and not alone at home will this be the case, but abroad also, wherever Britons seek a temporary home. Feats done "far away" will be contrasted with those done at home, where it may be seen that those who have gone abroad have not forgotten the manly games of their boyhood, for in the remembrance of them may be traced the never-dying love of home, and its purest, noblest memories.

The Garden.

A PLEA FOR GARDENING PURSUITS.

TO the mind of ardent and enthusiastic temperament, no cup of pleasure can be more brimming, more full of soul-satisfying delight, than that of seeing the labours and toils, be they of the hands or of the brain, necessary to the pursuit of any favourite recreation or self-imposed task, rewarded with the garland of success. And if we accept this as true, in the case of any spirit burning with love for its favourite pursuit, and quickened by the desire to excel, surely not the weakest portion from the cup of satisfaction falls to the lot of him who finds in studying and examining Nature's works, and in experimenting upon her subjects, the field in which his soul most delights to spend itself. This is a realm ransacked often by keen eyes and subtle brains, yet never found barren by their successors, but ever yielding fresh beauties and new proofs of the wondrous mechanism of the structures which meet the student's eye—a mine of gold, dug deeply into, yet yielding at each fresh probe of the inquiring mind, still richer treasures than before. What wonder, then, that her devotees should be named Legion, when all may drink at her fount and be filled to satiation, and may yet drink again without fear of the spring being exhausted? In reflecting on the subject, there is no idea that strikes us more forcibly than the illimitable bounds of this field of study, and no lesson can we there learn more completely than to know the utte[illegible] of our ignorance, and to fee[illegible] hat

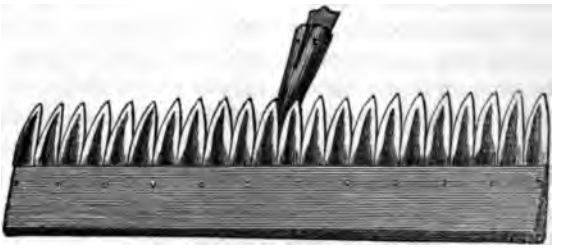
> [illegible] a Powe
> Insect[illegible] the illimitable world,
> That guides its motions from the brightes[illegible]
> To the least dust of the sin-tainted mould;
> While man who madly deems himself the lord
> Of [illegible] ough[illegible] ut weakness and dependence.
> This sacred truth, by sure experience taught,
> Thou must have learnt when wandering all alone;
> Each bird, each insect, flitting through the sky,
> Was more sufficient for itself than these."

Even after years—and it may be a lifetime—of application, this has been of sufficient service to expose our helplessness, and to dash the cobwebs from our intellects, which are so apt to become warped and lulled with a miserable, betraying feeling of self-sufficiency and innate satisfaction with the extent of our discoveries and acquirements, which, to well regulated and properly disciplined minds, serve but as a whet to the appetite, and a spur to further and more earnest exertions towards a still higher degree of improvement. That, however, in the particular sphere to which this Journal is devoted, there has been no standstill in the matter of research and experiment, we have no lack of evidence, which will be patent to all who scan the announcement of novel subjects from time to time sent forth to the world, which have either been rescued from the solitude of their native wilds, where, doubtless, still many remain to "blush unseen, and waste their sweetness in the desert air;" or in the shoals of novel and more perfect form of our cultivated plants which are born annually in our numerous hybridizing establishments. This inter-breeding of plants is a pursuit which must always command an intense degree of interest amongst such as possess the facilities necessary to its indulgence, as we may easily learn when we observe the degree of zeal with which it is usually followed up. It has, however, the drawback that it must necessarily remain the privilege of the few to stamp the impress of their works on Nature's subjects; but still to the masses

is the book of Nature open, where they may study and know the beautiful and lovely in creation. In the resurrection of the seed, which, when planted in genial soil, bursts the bonds which have hitherto held the germs of life imprisoned within their dry walls, and sends down the tender rootlets in search of the food necessary to the development of the future plant;—in the budding branches and green leaves, with their nerves and veins bearing that nourishment to the farthest extremity of the young growth, and in their turn robbing the atmosphere of the gases which they by an invisible process convert into food for the parent plant;—and in the bright blossoms, gay with their lovely tints of gold, and crimson, and purple, and redolent with incense of sweet savour, to be succeeded, after they have fulfilled the purpose to which they are sent, with the luscious fruits so welcome to every palate;—in these, and in the variety of forms in which they are presented, we have surely enough to marvel at and admire. But with a full appreciation of the pleasures thus laid open to all, it must be conceded that the mere passive gratification which the unlooked experience must ever remain but as a shadow, when compared with the degree and intensity of pleasure with which the active student contemplates the result of his efforts, when he finds success, after, it may be, many difficulties, throwing a halo of delight around his work, and adding new zest to the continued pursuit of his pastime. His reward, so justly his due, will be begrudged by none, for surely he who thus devotes himself to the improvement and development of Nature's works, may lay equal claim to be a benefactor of the world with him who makes two blades of grass to grow where only one grew before. But with all this, if a mere passing sensation of delight, however thrilling, were the result of labours which are by no means light, it might be doubted whether the remunerations were worthy of the exertions. The continued though pleasurable strain upon the mind, which the care of subjects at all times liable to misadventure engenders, demands that some permanent, tangible good may accrue to the devotee; nor can it be said to be withheld, or offered with any stinting hand. The pursuit of knowledge, at all times one of the noblest ends to which the life of man can be devoted, is surely still more ennobled when directed into a stream where the Omnipotent works are so prominently thrust before our notice, while it will be universally acknowledged that in no study are the better feelings of our nature nursed and strengthened more effectually, while none can bring in their train tendencies of a more humanizing and elevating character. If anything will expand our intellects, and tend to efface those hard and dry lines which form part of the unlovely side of human nature, and causing us to think less of ourselves, will teach us a little more charity between man and man, that monitor is surely to be found in Nature herself, if anywhere on earth.—*L.*

DAISY RAKE.

L lawns are infested, more or less, with the common Daisy (Bellis perenıd even supposing the mowing machine plied once a-fortnight, these little ng pests would be up and bespatter en surface with their small button-like . A lawn to be in perfect order must n—no other colour is at all permis-



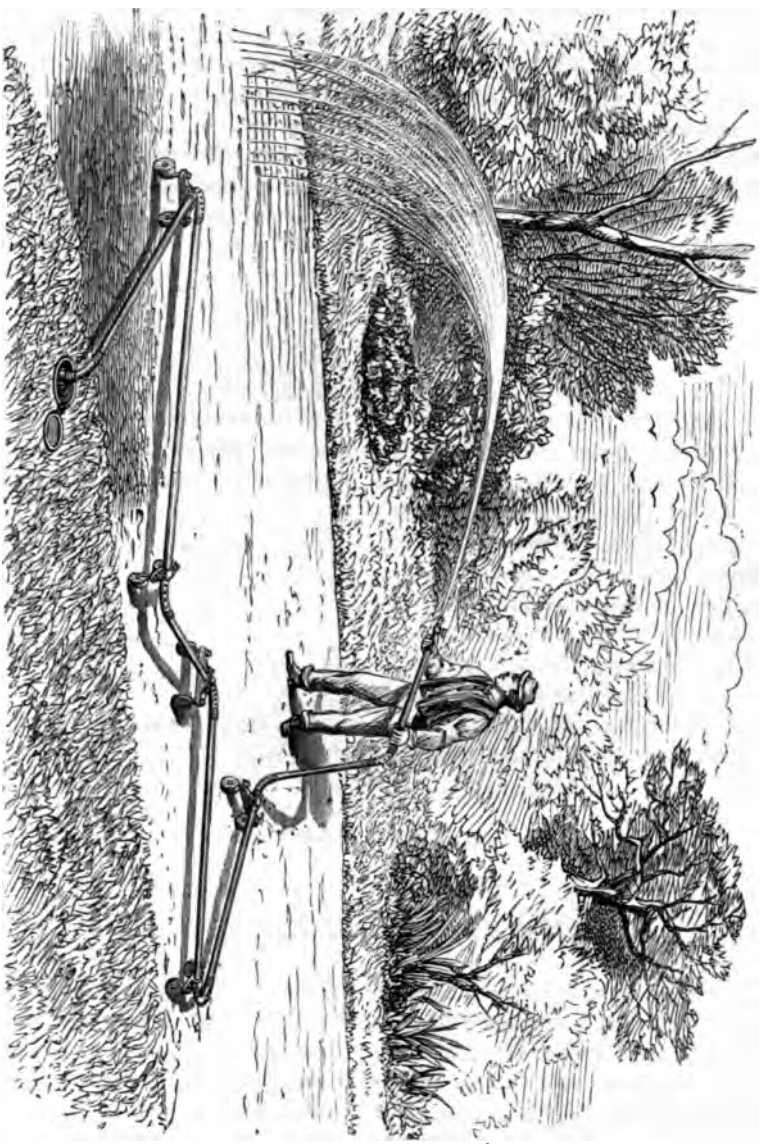
Daisy Rake.

Ribgrass (Plantago-lanceolata) and , if not extracted altogether, must be own. Labour is dear, even of the st kind, and no one grudges it more ıost villa gardeners. Why they do cannot well tell. First cost is paid, ep is also paid, but not without disıle comment. The keep of the garden, educed to a minimum, and something

like order pervading its parts, is what every one should aim at. To do so now-a-days, the best tools for performing the respective work must be provided. Any one can run over a lawn with the Daisy rake (see fig.), in one-tenth the time they could do so with a mowing machine: therefore the Daisy rake is a little handy implement, where first-class order is desired and demanded, which will soon pay itself. Your lawn may, even in the usual run of weather, go from fourteen to twenty days' interval between mowings, if the rake be used; if not, you must cut at least every ten days. It is very easily wrought after a little practice, although the form of working it is of a totally different kind from that applied to the garden-walk rake.

WATERING APPARATUS.

)URING the scorching weather that prevails, some sort of watering apparas in request. In Paris, and in continental is constantly in use. Their summers are much hotter and drier than ours, but drought is becoming more continuous every year, as



Warner's Apparatus for Watering Lawns and Gardens.

:s and towns, something like what is reented in the Messrs Warner's engraving can be seen by reference to the weather or meteorological tables published year by

year; and it is incumbent upon those especially who have the management of parks, and even of roads and streets, to employ an apparatus that will, in the first place, do the work efficiently, and in the next place be of the durability that will make the investment a business-like one. Of course parks must first be provided with a sufficient number of outlets to connect the apparatus with, so as the ground can be regularly gone over. Streets are well provided in this way, and if an apparatus such as our engraving represents be attached, the operation is done cleverly and most satisfactorily. Our English public parks have not been so well provided for as those of our continental neighbours, partly from difference in climate and in rainfall; but it is only a question of time when they must be so attended to, especially in such a city that will soon number 4,000,000 inhabitants. The Messrs Warner's apparatus is made of galvanized wrought iron pipe, connected by copper rivetted flexible joints, and supported on wood carriages, with pivot castor wheels. It is, therefore, a really substantial article, such as we have some pleasure in recommending. Were Borough Corporations and Boards of Health to secure several sets of this apparatus, their streets would be well watered, and at less expense than that incurred by the antique water cart with its perforated discharge box.

GARDEN DIBBLES.

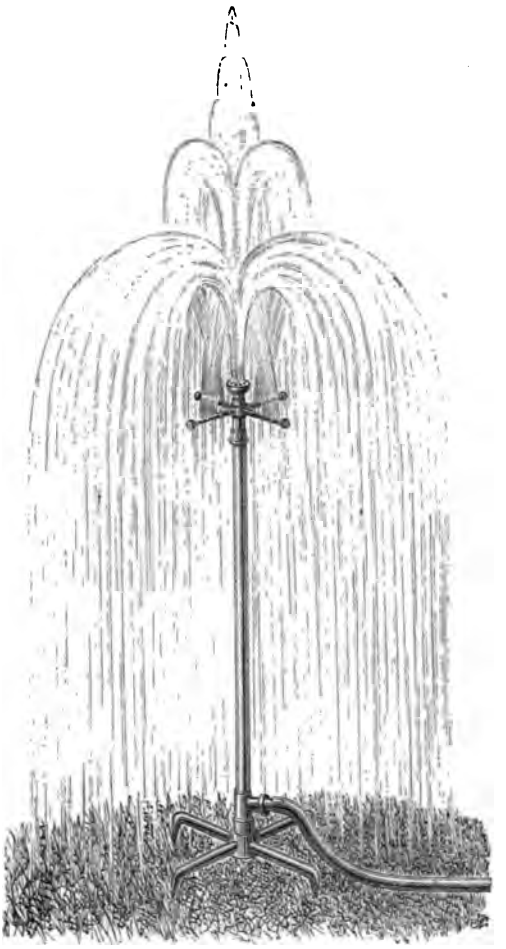
WE illustrate a set of three garden dibbles to recall attention to a useful requisite. All of these forms may be used in gardening operations. The open handled one is almost continually in use in the kitchen garden for the transplanting of the members of the Cabbage race (Brassica), and so is the T handled one, although gardeners prefer it for lighter transplants. The smallest one of the three is useful for putting in flowering-plant cuttings, such as Pelargoniums, for instance, which do well planted out in beds in the open ground, to be lifted before frost comes, and potted into pots for winter preservation.

Garden Dibbles.

AN EXTEMPORE FOUNTAIN.

WE do not know a better and cheaper article for the utilitarian and ornamental purposes of villa garden furnishing, than the subject of our engraving, to which we are indebted to Messrs Warner & Co. It is quite portable apparatus, and has only to be connected to the supply cistern of the house to represent the arching flow of water shewn in the engraving. It is good for watering villa lawns, and keeping them in the style so desirable to see during our short somewhat tropical summer, and how very beautiful may the operation be conducted by such a jet, or combination of jets, as this presents. It is indeed, as our heading makes it, an Extempore Fountain, refreshing, cooling, and beautiful. Nor need it always be a fixture. It can be removed from one place to another

without much trouble. It requires only additional length of gutta-percha or India-rubber piping, and the making of a connexion with the discharge pipe of the supply cistern. It is only 4 feet high, fitted with 10-inch revolving Barker's mill fountain jet. It is said to water from 10 to 250 square feet of lawn, according as the pressure is regulated by the stopcock in the downright pipe from supply cistern. It is so useful as well as ornamental, that the exceedingly small sum of a guinea will not prevent many from noting it down to order among their other "gettings."



An Extempore Fountain.

NEW AND RARE PLANTS.

RHODODENDRON LONGIFOLIUM.

THE Sikkim and Bhotan Rhododendrons have no ephemeral reputation. They adorn our conservatories in the spring months with such great capitate heads of blossoms as to command astonishment and admiration. True, we are a little disappointed that our climate is not good enough to keep the plants in such condition as to ensure health and inflorescence, but we give room in our artificial climates of glass to far less decorative orders of plants, and if they had been

Fig. 1.—Rhododendron longifolium—Single Floret, full size.

called by any other name than that of Rhododendron, we might, as a general horticultural public, have been more in ecstacy about their merits. Another drawback to many is the shyness with which they send forth their blossoms, requiring to be of some age and size before we can see their true character. To such as are limited to a small portion of glass, it is only the Lilliputians of vegetation that are eligible; and however much such a class may admire the beauty of flowers in general, and Rhododendrons in particular, they cannot probably give space adequate to the growing necessities of Sikkim and Bhotan Rhododendrons. These, indeed, must be

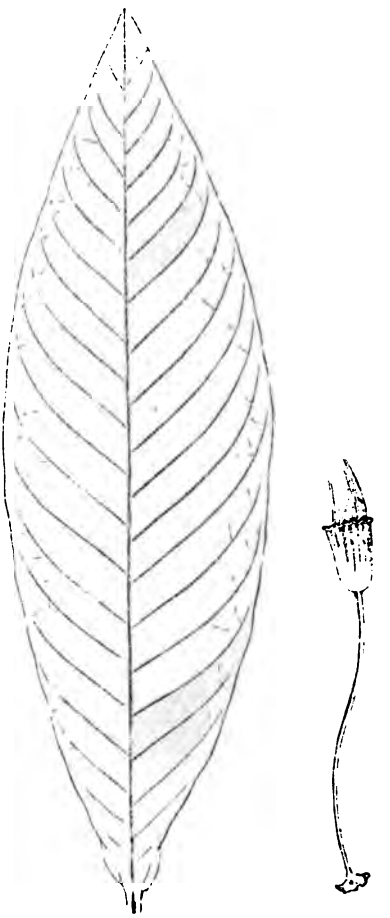


Fig. 2. Leaf, half size. Fig. 3.—Pistil, full size. Rhododendron longifolium.

accounted and provided for accordingly, as the mammoths of our artificial climates covered with glass. But few will deny them their right to a place and position among the choicest of exotic plant life. The subject of our engraving is one of those that

does best planted in a cool conservatory border, after the same fashion as culturists provide for Camellias. There, with the mild heat of summer, they grow and form both blossom and wood buds—some plentiful and some less plentiful. All such as shew a disposition to be rank growers, are not free bloomers in youth. Really they are no less wood buds, but they frequently lose somewhat of their rankness; and the general cessation of manufacturing activity that characterizes the supply and demand of the plant is more favourable to the manufacture of the organs of reproduction. Hence, if growers had a little more patience, they would see these miniature mammoths become more fruitful after they reached a certain age.

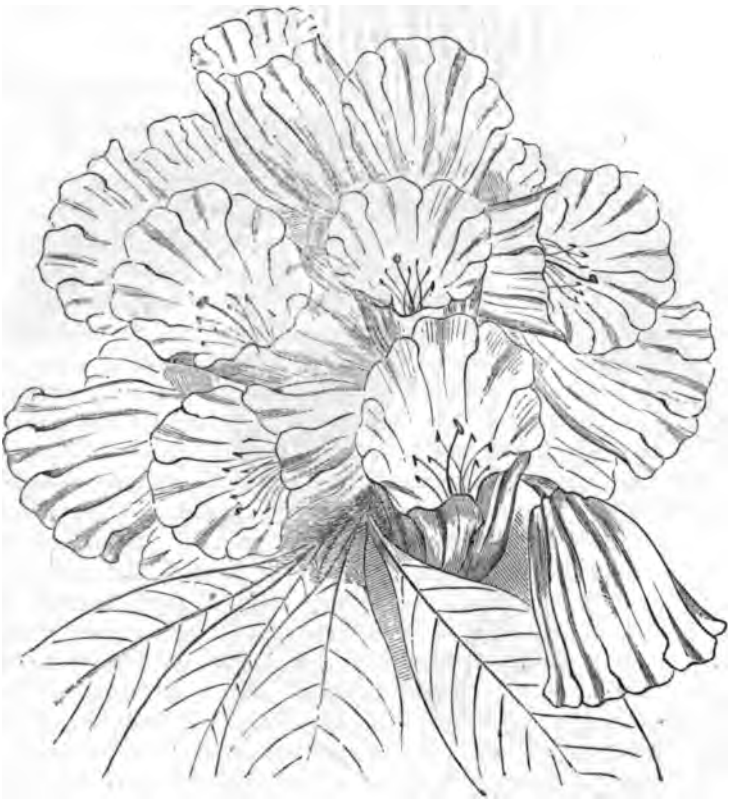
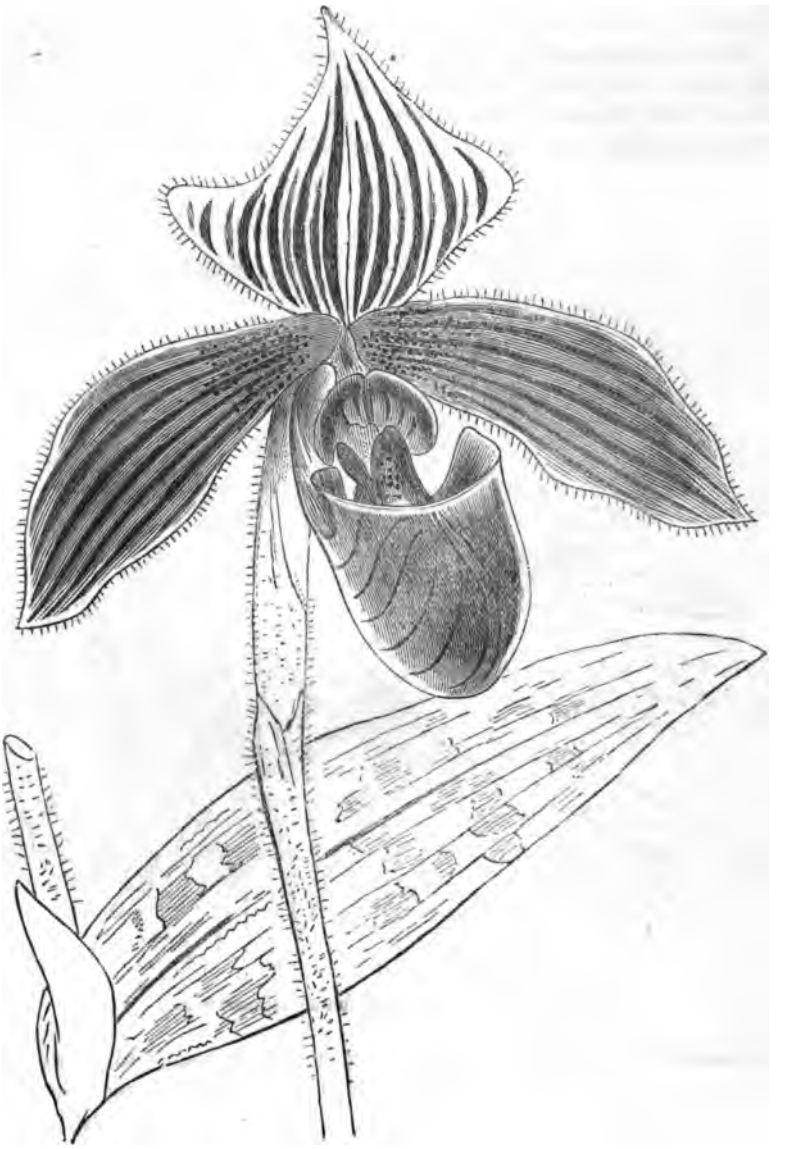


Fig. 4.—Rhododendron longifolium, reduced in size.

Rhododendron longifolium is one of the large foliaged kinds, of a pale green upper surface, and somewhat hoary beneath. It was discovered by Mr T. J. Booth in Bhotan, who first sent home seeds about the year 1855. The young plants resemble those of the R. argenteum of Hooker's so closely that many growers considered them identical, and consequently the present species still appears in many collections under the last-mentioned name. The two are, however, perfectly distinct, and while R. longifolium has much of the fine foliaged appearance of R. argenteum, it seems to be a freer flowerer, and dwarfer in habit than that tree-growing species. Like most other Himalayan plants, it starts too early into spring growth for our climate; consequently, its expanding buds and young shoots are often destroyed by spring frosts; and even in the milder districts of Britain, where this objection may not apply, its early flowering propensity must always be against its successful open-air

re. As a conservatory or greenhouse
:, it cannot be too highly recommended;
it has also much in form, texture, and

(4, at first of a very light primrose colour, faintly tipped with rosy pink, changing afterwards to a purer white, with deeper tinged



Cypripedium purpuratum, see page 191.

ıty to entitle it to careful attention at
hands of hybridizers; the flowers form
compact globular heads or trusses (fig.

tips. The individual florets (fig. 1) are deeply bell-shaped, slightly swollen in the middle, and with eight shallow cordate

or two-lobed segments, corresponding with the sixteen filaments and other anthers, as well as with the sixteen divisions of the seed capsule. In texture they are remarkably fleshy or waxy, and prominently marked in the bottom with black, as in some tulips. The adult leaves (fig. 2) almost resemble those of Magnolia umbulla. The pistil (fig. 3) is larger than that of any other species, if we except that of R. Nuttallii. Some continental growers have sent out this species under the name of R. macrophyllum.

CYPRIPEDIUM PURPURATUM.

This is one of the Ladies' Slippers that is easy of culture. None of the family are hard to grow, unless we name Cypripedium japonicum, which is certainly one of slow growing tendencies, and is, consequently, termed by the craft a "miffy" grower. The one engraved (page 190) is from the Malayan Archipelago, and requires strong heat and plenteous moisture. It revels in the ordinary Cypripedium soil mixture—not soil, certainly, as it is generally understood, but a combination of sphagnum, of fibrous peat with the earthy particles well picked out and the fibre retained, and of sand particles and little lumps the size of broken loaf sugar. That is a good staple, none the less efficacious if pieces of charcoal, and pieces of chalk or lime, were somewhat scantily incorporated. The leaves partake of the combined characters of C. barbatum and C. venustum. The flower peduncles are longer than the latter, and much shorter than the former named species. When in flower and in health, it is quite a nice dwarf decorative plant that any one could admire, and the flowers are brighter and better than C. venustum. It is very free, and often comes with two flowers on the peduncle. This is not common with either C. insigne, C. venustum, C. barbatum, C. villosum, or C. hirsutissimum, but all these species occasionally produce a two-flowered peduncle, not from the accumulated strength of the growing plant and the stronger peduncle, but from a sporting tendency common to the whole floral race. The plant in question is cheap to buy, and to such as have a stove, we would recommend it as one likely to give satisfaction. We append the following diagnosis:—"Dorsal sepal, white, richly spotted with purple; petals, brownish purple, striated with darker stripes, and at the base spotted with deeper purple. Lower sepal (two coalesced), greenish. Lip, greenish purple, obscurely veined. Sterile stamen, very large, reniform. Ovary, long, club-shaped, furrowed, downy. Leaves, radical. Distichores, mottled.

ANGRÆCUM CITRATUM.

There are not many Orchids that have found their way into this country from Madagascar—none, indeed, to the best of our knowledge—at least no novelty of first-rate character; but those collected and sent home first by the Rev. Wm. Ellis, who wrote a book on Madagascar. Two novelties of the first stamp of excellence are now in our Orchid collections—the one the curious starfish like Angræcum sesquipedale, and the handsome flowering subject of our engraving, Angræcum citratum, fig. 6. When this plant was first exhibited by the Messrs Veitch, at the International Show of 1866, at South Kensington, it took many of us by surprise; and had it been in the condition it has eventually been brought to, it would have doubtless won first honours as the best new plant exhibited. As it was, it was placed second, and run Mr Linden, of Brussels, very hard, with the good example of Aerides japonicum, which Professor Reichenbach, along with the writer of this article, thought more worthy of the distinction. Our engraving (p. 192) is a representation of the habit of the plant, its character of flower racemes, and the way it ought to be grown in hot-air stoves. Coming from Madagascar, it requires the tropical heat of an East Indian climate, and seems to revel in subdued light during a bright sunshine. Indeed, not one of the Angræcums—and we have them from Sierre Leone, from Japan, and De Chaillu's species from Gaboon, as

well as from Madagascar—can bear the slightest bright sunshine under glass. The plant in question, therefore, must be closely shaded, and frequently bathed in moisture. For all small growing plants, block or basket culture is needed. To attempt to grow small things in pots, and place them among a miscellaneous lot on a plant stage, would, in time, be

Angræcum citratum—see page 191.

utter ruin to the species. They all seem to prefer air moving about them; and granting they like shade, still they have a decided preference for a position near the glass in our artificial homes. The appearance of the flowers is interesting, and forms a theme of observation and comment by almost any one who sees them. The orchidophilist of course examines them with great pains, and is delighted to look upon the newborn flowers as they re-appear in the late spring of each returning season. The drooping arching racemes are handsome in outline, but the regularity of the disposition of the flowers, down either side alternately, is about as precise and formal as if their position had been marked out by square and rule. The flower is white, standing pretty smooth and flat, and is adorned with a long spur-like nectary, which adds very much to its insect appearance. It is yet comparatively a rare plant, and probably somewhat too expensive for many villa gardeners, but to the lover of the curious and interesting, it is a gem that will become more prized the longer it is in any one's possession.

Work in the Garden during September.

From "THE VILLA GARDENER."

THE VINERY.

DURING fine weather it is hardly possible to keep Grapes too cool; still, amateurs occasionally err in this respect. They hardly keep pace with the suddenness of atmospheric transitions. They may have, for instance, a week of glowing sunshine, succeeded by mild genial nights. All at once the rains come, the temperature suddenly falls—it may be 10 or 15 degrees. In such cases, a change of treatment should tread sharply upon the changes of the weather. Air must be reduced, or perhaps wholly shut off, and a fire should be lighted. Nothing injures, lowers, the quality of Grapes more certainly than sudden or great changes during the finishing stage. Sudden depressions of temperature seem to set the juices of Grapes vinegar-wards. And once the luscious wine in the clusters gets to that stage, we cannot bring it back sugar-wise again. A pretty high day temperature and a low night temperature are the most favourable for maturing Grapes, and finishing them in good style. A day temperature of from 70 to 80 deg., and a night of from 55 to 65 deg., are the most suitable. We not only admit, but invite a wider range than usual. But it is important not to reverse the order between day and night. Nothing is more unfavourable to the ripening of Grapes than a low day and a high night temperature. It arrests the ripening process, and ruins all. It is putting the "cart before the horse"—a thwarting of Nature, and Nature takes her revenge. What should be be studied and imitated is the still coolness of an autumnal evening, when the dews fall heavily, and the temperature is reduced by the energy of radiation from a cloudless sky. Next to a low night temperature, one of the best aids to maturity is air in motion. Stagnant air, always more or less injurious to vegetation, is intolerable to fruit in the ripening stage. It arrests its progress, lowers its quality; in fact, hardly any fruit seems capable of ripening well in a stagnant atmosphere. Leave air on at night to cool the Grapes, and colour their plump cheeks at the same time. But, beware of the wind, and see that it is not allowed to fasten its sharp, thirsty teeth in your fruit, else it will bite out their tenderness, and drain them dry of their sweet juices. Moving air without draughts of cutting winds; cool night airs without cold chills; nourishing dews, if possible, while far removed from hoar frost, are among the most favourable conditions for the ripening and colouring of Grapes.

Any late growths that smother finer leaves, or unduly shade the bunches, may be gradually removed. The best leaves—those that are now filling up and fattening out the buds—that are to be from 6 to 12 inches across next season, these ought now to have the full light and heat of the declining sun. Every ray of both are now engaged in manufacturing embryonic Grapes for the year 1872, and you must see that they are not hindered in this prospective work by overshadowing or overcrowding. They are doing the greatest and most important of all vegetable work, and ought assuredly to have elbow room to do it in. This breathing space is likewise the likeliest of all means of ripening the Grapes, and putting that luscious, well-coloured finish on them, so much prized by the best Grape growers.

THE ORCHARD HOUSE.

The treatment may be very similar to that of the Vinery. Any Peaches may be syringed overhead in the afternoon of bright days, to within three weeks of their season of ripening. It is important that the water should be clean, genial, and soft. Nothing is more offensive than dirty or semi-putrid water on such fruits; while hard water leaves behind it a deposit of lime, crusting the fruit as with a stone girdle, and eating into its delicate texture. These sprinklings help the fruit to swell, keep the leaves clean, and preserve the trees in health. A week or ten days, however, before the fruit is fit to gather, all sprinklings must cease, as dryness is favourable to flavour; while moisture resting on the somewhat soft texture of Peaches and Nectarines not only lowers their quality, but is apt to induce rottenness. The latest varieties of Peaches, Nectarines, and Plums, should be placed at one end of the house, where they may be kept closer than those that are now ripening. An excess of air is apt to check the finishing process of stone fruits, as already pointed out in the case of Grapes. As a means of improving quality, it is good practice to warm orchard houses in wet, dull, windy weather. This enables air to be freely admitted, without unduly lowering the temperature. The earlier varieties will need more air, less water, and no syringing overhead. A good deal of judgment is needed in the watering of fruit trees in the last or finishing stage, and some withhold it altogether. When the trees are planted out, this may generally be done with safety. The roots have a wide range, and can mostl

find water enough on some portion of it. But with trees in pots it is very different, and a medium state between wet and dry must be preserved. Keep the leaves from flagging, and the soil from becoming sour. Water is needful—more for the well-doing of the plant than the ripening of the fruit. Nothing, however, hinders ripening more effectually than an undue withholding of water, unless it be an excess of the same, while flagging leaves invite the attacks of red spider, thrip, and other insects. With the first symptoms of maturity in the fruit, all manurial application should cease, either in a liquid or solid state, until the fruit is gathered, after which the sewage applications may be renewed should the trees seem weak. Any leaves that unduly shade the fruit may be turned aside or removed; should such displacement detach them from the branch, their work was completed, and their removal is no loss to the tree. It is good practice to run the hand loosely up the shoots, and detach all the leaves that such gentle means will detach. This brings more light to play on the fruit, as well as the leaves left. Occasionally, free growing young trees will still need tieing in, arranging, or even cutting out of young shoots. When growth is strong and rapid, those young shoots tied in near the base of the branches often overtake and overgrow, towards the autumn, those laid in nearer the upper end of the branch. In such cases, the higher one may frequently be cut away. By similar means overcrowding must be guarded against in standard orchard house trees. There must be no overcrowding, which is always the parent of weakness.

THE GLASS HOUSE.

The treatment of this house throughout the autumn must be determined chiefly by its occupants. If filled mostly with Zonal and Variegated Pelargoniums, Fuchsias, Liliums, Petunias, &c., it can hardly be kept too cool. Leave the sashes and doors open night and day, unless the wind rages and the rain drives. Shade from the sun for at least two hours on each side of noon, unless the roof is shaded sufficiently with such climbers as Mandevillea suaveolens, Passion-flowers, Zichias, Lapagerias, Taczonias, Variegated Cobæa, or even Fuchsias or other beautiful and shady roof plants. Very bright sunshine shortens the life and spoils the colour of most flowers, and they ought to be shaded from its strongest light and fiercest heat. Even more shade will be requisite if the glass house is filled, as it often is throughout the autumn, with such plants as Palms, Ferns, Achimenes, Gloxineas, Balsams, Cockscombs, Variegated Begonias, and other such semi-tender plants, that ought to have a warmer, closer house than Pelargoniums, &c. From 55 to 60 deg. is the most suitable temperature for these plants in flower; and even when the air is warmer, care must be taken against draughts or sudden rushes of cold air through among Ferns and other fine foliage plants. Though they look strong and robust, and no evil seems to come of a sharp wind, it comes, by-and-by, in the disfigurement of fronds and leaves, when their beauty would have been most prized probably. But, generally, the glass house is an *ominum gatherum* of all sorts of plants from all kinds of places, and as such, the tenderest should have the warmest nooks and corners. Late flowering Fuchsias and Zona Pelargoniums may still be strengthened in leaf and flower by the use of manure water. For most of the other occupants, soft clean water will suffice. In dull or wet weather, keep the foliage or flowers perfectly dry, as damp is fatal to most flowers, notably double Pelargoniums. Where Show, Fancy, or French Pelargoniums have to be grown in this house, they must be reduced, potted, and kept close now, until they have made new roots; after which, expose to the air freely, to prevent their being drawn. It adds much to the interest of the glass house, to rearrange its furniture frequently. The plants also thrive the better by a frequent change of position. Should they do indifferently in one place, the chances are they may do better in the next. Such arrangements put a new face on the glass house, and gives the charm of novelty—no trifling one in horticulture.

PITS AND FRAMES.

Hot Pits.—Melons—see that a brisk surface and bottom heat of from 70 to 80 deg. is maintained to crops that are ripening. There must be no declension of temperature till maturation is perfected, rather should the heat culminate at the last; withhold water as the fruit reaches maturity, an excess either in the earth or air is apt to burst the Melons, one of the worst fatalities in Melon growing. Take care also to raise the fruit clear of the damp earth. A piece of thick glass 6 inches square, raised on four thumb-pots placed firmly on the soil, forms a cleanly, safe resting place for the fruit. So elevated, they are out of nibbling reach of wood-lice, who have most troublesome teeth Melon-wards. In all manipulations with Melons the fruit should never be handled with the stalks, but carefully with one or both hands embracing the fruit, according to its size. Give abundance of air during sunshine, shut up close about 4 o'clock, and cover during cold nights. Remove superfluous growths from the plants, and see that all the chief leaves near the fruit are preserved in health and have room to grow. Properly fed and nourished with water, and with the leaves from 10 to 15 inches clear of the glass, no amount of sunshine will injure Melons; on the contrary, they will gladly utilize all that comes, and ask for more.

Cucumbers.—Go over the plants once or twice a-week, to cut all fruit that are fit, remove old leaves, encourage new ones, and stop the young shoots at every fresh leaf made; also thin the fruit to a reasonable number, water three times a-week, sprinkling daily. Top-dress with fresh soil once during the month. First scrape off all the old soil right down to the roots, then lay on nice pieces of turfy loam about the

size of pigeons' eggs, press this firmly down and pack them closely together, and in about a week or ten days the new layer of loam will be possessed with such an array of white food-eaters as it does the cultivators' eyes good to see.

Attend to the potting off, or shifting into larger pots, of any tender plants or cuttings, and cover all hot pits at night, as the cold evenings set in.

Cold Pits. — Shift on Chinese Primroses, Cinerarias, Calceolarias, Mignonette, Pinks, Carnations, &c., for winter flowering. Put in, or pot off, cuttings of Pelargoniums, Fuchsias, Petunias, and shift and grow on late plants of the same. Procure and pot Hyacinth, Narcissus, Tulip, and other bulbs, and plunge the pots overhead in ashes, coco fibre refuse, or other cleanly non-conductor. I have found it best, upon the whole, not to water the bulbs after potting; if the soil be moderately moist, and the bulbs plunged in a medium, neither wet nor dry, they will draw enough moisture from such materials until the pots are well nigh filled with roots. Early potting is the secret of early and strong blooming.

THE FLOWER GARDEN

Will be glowing with beauty now. It has been long of coming to perfection this year, but at last the copious rains have filled it to repletion with material; and it is hoped that the sun will now call out and bring forth a rich harvest of blossoms from the fat succulent branchlets. All excess of growth must be controlled, arranged, and, if need be, removed. Fulness of furnishing—the idea that the beds are just about to run over their boundary lines, is a pleasing idea. But if they do run over, the sight is not pleasing; it suggests neglect, disorder, and lack of care—all which are incongruous with high keeping. Therefore all irregularities, as well as undue exuberance of growth must be rectified at once, and heights, as well as distances, carefully regulated and arranged. Some plants will need raising up, and others pegging down; most of them will need picking, cleaning, denuding of dead flowers or tattered withered leaves; and all, looking over for seeds or any kind of untidiness. The mixed flower garden and herbaceous border will need more regulation and care this season than the more formally filled flower gardens. Plants of such different habits and varied forms of growth being so closely associated as they must be in this style of furnishing, constant attention is needed to prevent the stronger from absorbing or overshadowing the weaker. Hollyhocks, Dahlias, Phloxes, Herbaceous Asters, Solidago, and other powerful growers, must be staked, pruned, and kept to their own place. While equal care will be needed that such annuals as Asters, Marigolds, Zinnias, Stocks, and other free growing annuals, do not overrun and smother the more permanent and valuable Alpine plants. If these are to lighten up the dead base earth with glory and beauty from January to May, inclusive, then their leaves must have a bit of free earth and an open patch of blue sky all to themselves throughout the summer and autumn months.

Pelargoniums, Petunias, Verbenas, Argeratums, &c. —Finish potting in cuttings of.

Carnations, Picotees, Pinks, Pansies, Hollyhocks, &c.—Plant out rooted cuttings, layers, or established seedlings, on beds or borders of nice rich soil. Choice perennial Phloxes, Pentstemons, and other biennials, often throw out from the flowering stem or the bottom of the stools, nice young shoots for cutting, as soon as the buds finish flowering. All these should be inserted in the cold pit at once, and rooted before winter.

Dahlias will now need special attention if perfect flowers are expected. Strip the shoots thin, leaving only one flower to each. Support carefully with stakes, and develop size and colour with house sewage, or manure water made of guano or pigeons' dung.

Roses.—Attend to tieing late flowering shoots, unloosening and re-tieing budded Roses, and helping late flowers by liberal waterings with manure water. Be careful after this time not to stimulate dormant buds into growth, rather allow a Briar shoot to run away a-head of them, as, if the Roses break away after this, the chances are that the shoot might not be sufficiently ripened to endure the winter.

THE FRUIT GARDEN.

Continue to protect the fruit from vermin of all kinds. Their name is legion, and their modes of attack almost infinitely varied. Slugs, snails, worms of sorts, moths, ladybirds, ants, flies, wasps, earwigs, woodlice, centipedes, fungus, blight, saying nothing of four-footed vermin unnumbered, and birds of almost every every feather, and men, women, and children will be after our fruit. Between them all, who would not pity the poor fruit? After scattering by slaughter a good many of our enemies, we must still bar out a great many more with nets, bunting, wire, and other screens. All such means of protection should be well elevated above the fruits, so that our enemies cannot carry the protection down upon, by a sudden assault and battery. Again, I believe it would pay well in many gardens to employ wire netting close enough to exclude mice from such crops as Strawberries. We have destroyed hundreds of these most destructive vermin this year, and the cry is still—They come. Throughout the entire season they have amused themselves in cutting off the Strawberries, and piling them up in heaps by the score every night. Why, the havock and destruction they make is incalculable. The best antidote is the cat, but the gamekeepers destroy the cats, and the mice and rats likewise ever follow in the trail of game. Gather all fruit as soon, or rather before, it is ripe, and keep stone fruit a day or two before it is eaten. All late growths should be tied in to prevent them being broken: large leaves that overhang fruit, gently brushed

off, or placed to one side, to enable the fruit to have the full benefit of the sun.

Strawberries.—Fresh plantations may still be made, but the sooner completed the better, as it is necessary that the plants should not only be well established, but that the crowns should likewise be well ripened before the winter. Clear away all runners from, and top-dress old plantations. It is scarcely possible to over-feed Strawberry plants, and no crop pays so well for liberal cultivation.

Raspberries.—Carefully tie up, and liberally feed the double bearing sorts, cut out the bearing shoots, and thin out the young canes on the summer varieties, leaving about four of the strongest shoots to a stool.

THE KITCHEN GARDEN.

Potatoes.—Take up and carefully harvest at once each sort as it ripens. There are two advantages in this course. It saves the crop from disease, and liberates the ground for other crops.

Walcheren, and other *Brocolis*, and *Cauliflowers*, should be instantly planted in all vacant ground.

Cabbages.—Plant the new supply for winter. The Onion bed heavily manured is a good place for the main supply for Cabbage. Coat the ground heavily with good manure; dig deeply, and then tread the ground pretty solid before planting. Plant about 1 foot or 15 inches apart in rows, 18 inches and 1 foot asunder.

Onions.—Harvest as soon as ripe. See that they are nicely dried before being stored, and keep all the thick-necked ones for immediate use. Sow the Tripoli for large spring Onions, and the Welsh or two-bladed for eating green.

Lettuces, *Endive.*—Plant and sow for late crop, for standing and growing through the winter in the open ground, under walls, or under protectors, hand-lights, &c.

Celery.—Plant out for spring use, water, remove suckers from, and earth-up advancing crops. In doing the latter, either hold the plant firmly or tie it together, so as to keep the earth out of its centre.

A few seeds of early *Peas* might still be inserted on a warm border. Advancing late crops should be helped with manure water, as should those of *Kidney Beans*, *Cauliflower*, *Scarlet Runners*, and other exhausting and rapid-growing vegetables.

Weeds.—Destroy in the seed leaf. Keep the hoe going among growing crops, to stir and aerate the surface. Sprinkle young crops of Lettuce, Endive, Cauliflower, &c., with hot lime and soot, to destroy slugs and snails; and see that walks and the whole area of the garden have a clean, cared-for, fully furnished appearance.

The Veterinarian.

KNUCKLING, OR BENT LEGS IN HORSES.

IERE can be no greater mistake than to ascribe the conditions known as ling, or bent legs in horses, to contrac- : disease of the back tendons. Such a sion, however, is common, if not in- le, particularly among non-professional s.

:he limits allotted to this department, ınot do more than briefly notice the ɜ causes, reserving special consideration ıre opportunities under their appropri- ıds.

situation of the tendons or back naturally suggests to the mind, in the :e of an extended knowledge of anato- d physiology, that by diminution of ıgth of the sinews, extreme points are ıt together, and inevitably flexion or ıg of the joints takes place. This, with ɔearance of trembling and insecurity, are yesores in the estimation of horsemen, e deemed sure prophecies of an early ɪ broken knees, if not a broken neck icle; yet, when closely pressed, these ities admit—especially when they have ıimals for sale—that "scores are foaled l never go down." The asseveration eral and truthful application to many but it is the distinction which marks ference.

dons are not endowed with action; e mere prolongations to muscles for nsmission of power in moving distant ust as a rope is applied to a horse in ; a boat. They are subject to strain jury, but when so affected, indicate ne by swelling, in the form of large ll round nodules in the chronic state; ey are hot, painful, and diffused, in the cent. Yet in the latter, except when the ıas been extensive, contraction does not always ensue. It is also evident that in many instances the most severe forms of contraction of the fore limbs have progressed slowly, extending over years, but the tendons are *fine*, and totally destitute of swellings. Where, then, are we to look for the situation of the cause? The mere *supporters* of weight do not sustain damage, in proportion to the *movers*, therefore we select the muscles, and, as *post mortem* revelations have abundantly testified, wasting of their fibres, and general substance are plainly evident. Young animals, in certain districts, where too little attention is paid to them, are frequently affected; others are foaled in this condition, both hind or both fore limbs being attacked, the animal walking on the front of the fetlock joint, and committing sad injury. The appearances are somewhat ugly, for the sole of the foot is presented backwards, the appearances being due to the extreme power of the flexor muscles, while the extensors are deteriorated by weakness, due in this case to want of nutrition, but in the old animals to want of proper rest. The horses of all fast drivers suffer first, and those which work hard during the week at some moderately heavy work, and, as the Irishman *naively* puts it, "are taken out on Sunday by way of rest."

These causes bring about exactly the same conditions as observed in the foal, and being constantly operating, the muscles are wasted —the fibres, from frequent laceration, become absorbed, and their place is made up by non-contractile tissue. The extensor muscles, therefore, lose power—their true fibres are out-numbered by those of the flexors, which, never having had half the work to perform, now exert a constant strain, and the result is "bending" or "knuckling," as it is variously termed.

In France, the young animal when affected has been repeatedly subjected to a severe operation—division of the tendons *at the back* of the limb, and at a point diametrically opposite to the real seat of the disease. In England, the legs have been and are now scored, to please a morbid taste for surgery, by means of a red hot iron, and the animal is then turned out to rest at grass, where he is literally tortured by flies, and gains no ease, because he has to roam about continually for food. We are glad to find many veterinary practitioners prefer to abandon the use of the firing iron, except in certain cases where the operation is absolutely necessary; but when asked why they still make use of them, the reply is "Because our customers will have it." Some, we know, use them entirely for gain.

Zealous men have paid attention to causes, and the result is, knowledge has been acquired, which teaches, that much that cannot be cured may be prevented; and in the preservation of our domesticated animals, proprietors and veterinarians should honestly work together, by which mutual benefit *must* ensue, and the mere talker and money-grubber pushed aside as a cumbrous piece of rickety furniture, or as a pernicious obstruction to the progress of the cause of truth and science.—*A.*

The Dairy and Poultry-Yard.

THE MANIPULATION OF CHEESE.

A CORRESPONDENT of the *Albany Country Gentleman* communicates, in the pages of that journal, some valuable and practical advice to cheese-makers. He says:—

Not long since I received a letter from a cheese-maker in a factory in New England, containing the following queries:—"Will you please tell me what advantage there is in letting a curd 'change' before taking it out? In cooking I raise the heat to 96 deg. or 98 deg., but before the acid is perceptible the curd gets hard. Would the curd do as well if the heat was not carried so high—and why does it become so hard? Will a curd that is taken out perfectly sweet, cure as fast and become ready for market as soon as one that is changed?"

The reply to the first question of my correspondent would be—much, every way. From the time that the cheese factory system began to extend beyond the immediate region where it originated, and American cheese became an article of export in any considerable quantity, say from 1861 down to the year 1865, the great complaint of cheese dealers, shippers and English consumers, was the porosity, bad flavour, and ill-keeping quality of American cheese. These three ailments seemed to exist together almost invariably, and they condemned the product of our dairies to a very humble place in the markets of Great Britain.

How to avoid these ills became the study of cheese-makers, but up to about 1865 the agency of acidity or souring the curd to a certain extent, to accomplish this purpose, was little understood and less practised. The fear of having sour cheese had deterred cheese-makers from venturing into this unexplored and forbidding field of inquiry. The cheese, generally produced at that time was full of holes, and if not used when about thirty days old, it speedily took on a sharp, pungent, acrid flavour, very objectionable to those whose tastes in cheese are educated to appreciate a really fine article.

Thoughtful cheese-makers noticed that sour cheeses were invariably solid—very nearly or quite free from these pores of holes—and this observation led them at length gradually to experiment and see whether this same acidity, which in the form of sour cheese, was very objectionable and damaging, might not be used to advantage if carried to a certain limit and kept well under control.

The result was successful beyond the highest expectations of the few cheese-makers who here and there had been investigating the matter, and eventually there was wrought a revolution, quiet and unostentatious, and yet real and wide-spread, in the system of cheese-making in the best dairy regions, and in the principles governing that system. At first the idea met with opposition, sometimes with ridicule, but it has won its way into almost universal practice. I remember that at the Dairymen's Convention in 1864, when this idea of purposely souring curd slightly first began to be broached, a gentleman largely and successfully engaged in the manufacture of cheese in Western New York, opposed the new idea very strenuously, and in the report of the operations of his factory for that year, he says, "I want the miik to be sweet when it is brought to the factory, want it sweet when set, want it sweet during the working, and want the curd sweet when put in press. I have no sympathy for sour milk or sour cheese."

next year he came to the convention a
igh convert to the new principle in
-making, which he had so vigorously
ed. A proper degree of acidity or
g or "changing" in the curd before
ing it from the whey, or at least before
, results in a cheese close and solid in
, purer and cleaner in flavour, and of
acter to retain that purity of flavour in
rm climate, a much longer time than
rwise would. With such cheese, too,
s far less trouble from huffing or bulg-
d from getting out of shape, than with
descriptions of cheese. Of course, it
e point to be able to tell precisely the
ion of the curd at this stage, and to
just how far it is safe to allow the acidity
ance. And it is just here that bung-
nd incompetent makers fail, and it is
hat the arguments of those who con-
cheese-making merely a mechanical
ion, are refuted.

the second question advanced by this
-maker, I will give a moment's atten-
Ordinarily, the hardening of the curd
lace at the same time that the acidity
ange" mildly puts in an appearance.
l, the former is an indication of the
ce of the latter. And yet the harden-
ty occur without the souring, at least
od degree (for the term hardening is
neral and indefinite a term when
to curd, to enable one cheese-maker
rmine just what is the condition of a
cheese which another maker calls "hard," unless he can see and handle it). If I was troubled with curds hardening prematurely, I would use less heat, and would apply it very slowly and gradually. Many good cheese-makers believe that a temperature of 90 deg. to 94 deg. gives better results in cheese-making than to warm the curd to 98 deg. or 100 deg., always provided the milk is in a condition to give full and ample time in elaborating it into cheese.

The third question proposed has been partially answered in the remarks that have preceded. Curds taken out when perfectly sweet cure faster than those which are allowed to sour a little; indeed, such cheeses are generally fully ripe and ready for the knife when thirty days old. If not promptly used then, they deteriorate in quality and assume a sharp flavour—go into a species of decay, in fact. Cheeses thus made are quite unfit for export, but frequently are better liked by retailers in our home market, than the closer made and more tasteless ones which suit the foreign market so well.

Where such cheeses are preferred, and meet with ready sale and full prices, it is more profitable to manufacture them, because a slightly larger yield of cheese is obtained from the milk than by the other process. Such is rarely the case, however, and it is far wiser and more politic for the great mass of our cheese-makers to raise the standard of quality rather than lower it.

The Naturalist.

INSECTS INJURIOUS TO VEGETATION.

[In compliance with the wish of our correspondent, G. H., Wolverhampton, we give the following additional particulars on insects hurtful to vegetation.—ED.]

THE *Cercopidæ* proper, and the *Tettigoniæ*, the latter a very extensive, beautifully-coloured set of long, rather parallel insects, abound in South America and in Asia. The Cercopis and the allied genera are largish insects, strongly and broadly marked. We have but one small species in this country. Our little species of Typhlocyba, Evacanthus, and Jassus, are extremely beautiful little creatures.

Of the common Frog-hopper (Aphrophora Spumaria), in our little town gardens, how often are we annoyed to see our plants infested by the larva, which carries on its depredations on their juices, concealed by an envelope of white froth closely resembling saliva? The insect has derived its name of frog-spittle from this frothy exudation, which is secreted by peculiar organs in the tail of the larva. This exudation protects from the heat of the sun the soft body of the larva, which but for this would soon shrivel up; and also conceals it from birds and many insects which would otherwise prey upon it. Notwithstanding the concealment, wasps often get at these larvæ and carry them off. Few know that the little broad-headed brownish-grey jumping insect, so common on plants, is the frog-spittle insect in its perfect state. By many, these insects are regarded, along with the Aphides, as species of the very comprehensive though most unscientific genus, commonly, though vulgarly called "Blight."

The *Psyllidæ*, unlike other Homoptera, and the Aphides have long antennæ. They are very destructive to plants, diverting the sap. The Box of our gardens is often much injured by the Psylla Buxi, while the Psylla Pyri, and a Chermes found on the Apple, destroy the young shoots and leaves of the Pear and Apple. Many of these insects in their larva state, are covered with a cottony secretion.

Leuckhart, in his work on the "Alternation of Generations," has proved that a spontaneous evolution of eggs takes place in the Coccidæ. He ascertained that all the individuals of the wingless generation of the genus Chermes, or bark-lice, were of the female sex only, and that they laid eggs capable of evolution without the intercourse of males.

The common Fir-louse (Chermes bietis) passes the winter in the wingless state, in the form of a plump insect not larger than a grain of sand, under the covering of a woolly coat, at the base of the scaly young buds of the Fir. Leuckhart has convinced himself that the reproduction of the Fir-lice takes place in both generations by a parthenogenetic process, by the spontaneous development of the eggs. Leuckhart, who examined fully two hundred of the Chermes, never met with a male among them; he has no doubt that the Fir-lice generally propagate without males. He leaves it undecided whether males are entirely wanting, or whether they merely make their appearance from time to time, under certain favourable circumstances, and then fecundate the females; yet, he adds, "It almost appears to me as if certain anatomical conditions rendered the first supposition to a certain extent credible."

Aphidæ (plant-lice) are perhaps the greatest enemies of the vegetable world, and, like the

, they have been known to swarm at in such myriads as to darken the air. ight here quote from the writings of ıbach and Professor Huxley, who have y paid considerable attention to their , and who bear out Reaumur's asser- of the infinite and almost incredible ; of multiplication possessed by these looking plant-lice. That author calcu- hat a single aphis may in five genera- be the progenitor of 5,904,900,000 dants ; and he believes that in a single ıere may be twenty generations. Kirby pence shew that the aphides which wheat, oats, and barley, seldom multi- fast as to prove very injurious to these plants. The species of aphis which Pulse spread so rapidly, and cover the so completely, that the crops of Peas eans are often greatly injured, and mes even destroyed by them. These state that this was particularly the case ıe crop of Peas in 1810. In that year ɔduce did little more than equal the ɔwn, and many farmers turned their to the fields. The failure was universal ıe kingdom, so that a supply could not ained for the navy.

Eriosoma, so called by Leach from its gly woolly body, has no tubercles at ıd of the body for the secretion of lew. The antennæ are short, and the ings have simple oblique discoidal

his genus belongs the Aphis lanata or gera of authors, which is so destructive stems of Apple trees. Mr Knapp has . most excellent account of this insect rved in one of the western English s. He says:—

r Apple trees here are greatly in- ınd very many of them annually de- . by the agency of what seems to be feeble insect. We call it, from habit n unassigned cause, the 'American this noxious creature being known in rchards by the more significant name te blight.' In the spring of the year, a ɔariness is observed upon the branches ın species of our orchard fruit. As the season advances, this hoariness increases; it becomes cottony, and towards the middle or the end of summer the under sides of some of the branches are invested with a thick, downy substance, so long as at times to be sensibly agitated by the air. This substance on close examination is found to conceal a great number of small wingless creatures, busily engaged in sucking the juice of the tree. This they effect by means of a beak ending in a fine bristle. This is insinu- ated into the bark and the sappy part of the wood, and through it the creature extracts, as through a syringe, the sweet liquor that forms as it were the life-blood of the branch. This long bristle is not to be seen in every specimen. In those possessing it, it is of different lengths, and is usually kept closely concealed under the breast. In the younger specimens it may be seen protruding like a fine termination to the anus; but as the bodies lengthen, the bristle is soon concealed from view."

Mr Knapp continues as follows:—"The alburnum, or sapwood, being thus wounded, rises up in excrescences and nodes all over the branch and deforms it; the limb, deprived of its nutriment, grows sickly; the leaves turn yellow, and the part perishes. Branch after branch is thus assailed, until they all become leafless, and the tree dies."

The Eriosoma, not having wings, is dis- persed by means of this downy covering, which is wafted by the winds in small tufts, so that the creature is conveyed with it from tree to tree throughout the whole orchard. In the autumn this substance is generally long, and the insects being dispersed by the winds and rains which are then prevalent, try to secrete themselves in any crannies they can find. There are no data to tell us when first this noxious insect visited us. America, Nor- mandy, and the Netherlands, have all been supposed to be the sources whence it was derived. Our climate, at all events, seems to be very favourable to its increase.

In 1745, Bonnet published his wonderful observations on the reproduction of the plant-lice, and proved that the mother pro- duced her young when no male insect was

present. "He isolated the young aphis as soon as it was hatched. On the eleventh day the aphis produced a young one alive; another succeeded, and another. Every four-and-twenty hours the brood was increased by three, four, and even ten arrivals. At the end of twenty-one days, ninety-five young ones were produced from this single aphis. Carrying further his observations, Bonnet found that the virgin offspring of this virgin parent also became parents! We know that this reproduction often goes on till the eleventh generation; then this process ceases, the last generation is of perfect insects, with separate sexes, and these produce ova which next year become the productive virgins we have just been reading of." The rate of increase may be conceived by the following calculation. The aphis produces each year ten larviparous broods, and one which is oviparous; and each generation averages one hundred individuals.

Generation.	Produce.
1st.	1, aphis.
2d.	100, a hundred.
3d.	10,000, ten thousand.
4th.	1,000,000, one million.
5th.	100,000,000, one hundred millions.
6th.	10,000,000,000, ten billions.
7th.	1,000,000,000,000, one trillion.
8th.	100,000,000,000,000, hundred trillions.
9th.	10,000,000,000,000,000, ten quatrillions.
10th,	1,000,000,000,000,000,000, one quintillion.

Professor Huxley has made some very curious researches on the reproduction of the aphides, in which he ascertains that the virgin viviparous aphis produces its broods of young from unfertilized ova, while the female oviparous aphis produces her young from ova fertilized by spermatozoa, and that both broods in their early stages are very similar.

The *Coccidæ* which contains the well-known Cochineal, is a most anomalous family. The females are always wingless, and in their last state deposit their eggs and very speedily perish; their dried-up bodies serving as a cover and protection to the eggs. The mates of these insects are small fellows, not at all resembling their females in any particular, either of form or habit. They are active, and have only two wings developed, which they use by flying about in the bright sunshine; the place of the second pair of wings is supplied by two small projections somewhat like the poisers of flies. But to return to the females: Mr Westwood, speaking of the whole family, says, that without referring to their singular habits, "we find some of them on arriving at their last state so far departing from the typical characters of the winged insects, as to prove that Ptilota may exist, which in the imago state are not only wingless, but also footless and antennæless, and even in which all appearance of annulose structure is lost, the creature, in fact, becoming an inert mass of animal matter; a slender seta arising from the breast, and thrust into the stem or leaf on which the animal is fixed, being the only external appendage to the body." The most famed member of the family is, however, the cochineal, which received its specific name from the Mexican Cactus cochinilifer, or Opuntia cochinilifera of moderns, being its food plant.

The Cochineal when first imported was believed to be the seed of a plant. The insects are brushed off the plant with a squirrel's tail, and killed by immersion in hot water, and afterwards dried in the sun or by the heat of a stove, as alluded to above. There are three harvests a-year; the first is the best, as the impregnated females alone are taken; the young females are also collected in the second harvest; and the third harvest is inferior to the other two, as old and young females, and skins, are collected indiscriminately. Before the rainy season commences, the Mexicans cut off branches of the Nopal, loaded with infant insects, which they preserve in their houses; otherwise the insects would perish in the inclement weather. The island of Teneriffe annually produces several thousand bags of cochineal. The editor of the last edition of "Pereira" informs us that in January 1857, there were 4891 bags of Honduras cochineal in our warehouses, 567 Mexican, and 1401 of Teneriffe. To give some idea of the importance of cochineal as an article of commerce, the reader may be

d to know that in the year 1852 the
ts and exports of it were respectively
2, and 8964 cwt. There were also im-
l in that year 15 cwt. of granilla, a finer
and 271 cwt. of the dust.

:at quantities of cochineal are annually
ted into France from Algeria. There
reat nurseries there of the peculiar
s on which the insects feed; and in one
1839, M. Guerin-Meneville tells us that
91 kilogrammes were imported into
:e. The Algerine production is not,
'er, so valuable as the Mexican, though
)louring matter is nearly as pure and
:. The Spaniards have introduced the
ieal into the Canaries, and the Dutch
ava, with excellent results to their ex-
ers.

Teneriffe, it is on the Opuntia tuna that
)ccus feeds. The plant is abundant in
ria, where, according to Mr Johnson, it
a peculiar feature to the rocky parts of
ndscape. This writer informs us that
erchants of Funchal are beginning to
heir attention to the cultivation of the
neal insect, in the hope of its ultimately
ning a remunerative substitute for the

: Pe-la, or insect which produces the
wax of China, is a species of Coccus
as sinensis), which was believed to feed
kind of Privet, somewhat brighter in
id foliage than the stiff shrub known so
a every garden and hedgerow by that

Mr Fortune, however—a good
'ity—says that it feeds on a species of
It is chiefly found in the province of
huen, where the crude material is de-
d by the insects around the branches of
:e on which they feed, and resembles a
soft, fibrous, velvety coating of from
-10ths of an inch in thickness.

: late George Newport says:—"So
ete have been the ravages of the Coccus
Orange trees, that one of the Azores,
land of Fayal, lost its entire produce
his cause alone. The usual exporta-
)f fruit from Fayal has been 12,000
annually, but in 1843 not a single
was exported. This injury has already extended to St Michael's, and is still continuing; and the inhabitants of the whole of that group of volcanic islands, depending almost entirely on the produce of their Orange groves, and despairing of retrieving their prospects, are fast turning their attention to the cultivation of other objects of commerce. This amount of injury to a whole population by a diminutive and apparently contemptible insect, has been the result of but three years. The effects of this insect on a single article of luxury may fairly be adduced to shew that entomological inquiries are deserving of full attention. The Orange trade between this country and the Azores gives employment, in round numbers, to upwards of 200 sail of vessels.

Coccus Sinensis.—Mr Westwood has applied this name to the insect which produces the white insect-wax of China, an important article very much used by the Chinese in the manufacture of candles; as much as 400,000 lb. are believed to be annually used.

The bark-louse of the Apple-tree (Aspidiotus conchiformis) frequently does much damage to the orchard. It has the form of a minute scale, resembling a mussel or oyster shell in shape, and hence its specific name conchiformis. This insect adheres close to the bark, and is found often in prodigious numbers.

Porphyrophora.—Before the discovery of America, cochineal was obtained in considerable quantities from Poland. This cochineal was the dried bodies of the female of another species of the family Coccidæ, which derives its specific name from the country whence it was exported (Porphyrophora polonica). The female is roundish, about the size of a Cherry stone, and furnished with short legs; she is quite soft, and of a dark amaranth colour throughout. When dried, the insects shrivel up into a small size, and are covered with a bluish mould. The true scarlet colour is produced by infusion, with the addition of acids; while the purple is produced by a solution of potash.

Lecanium Coffeæ.—This creature does not seem to have attracted attention till about 1845, when it began to spread with such

rapidity that, in 1847, the planters became alarmed. It is curious that it was about the same period that the Potato Vine and Olive began to be affected by disease in Europe. This scaly bug seeks out the softest and most sheltered parts of the Coffee tree, such as the young shoots, the undersides of the leaves, and the clusters of berries.

Diptera.—An order of two-winged insects, constituting one of the most extensive groups amongst the Annulosa. Although, strictly speaking, they are only two-winged, yet they have, as it were, two abortive wings behind the true pair; these are commonly called *halteres* or balancers; they are frequently kept in rapid motion, whilst the true wings are apparently quiescent, and by this rapidity of motion cause a loud piping noise, this is particularly observable in the genus Sericomyia. Diptera are usually of moderate size, the largest known being a species of Acanthomera from Mexico—about 1¾ inch in length; the majority are, however, small insects.

Individual species are sometimes extremely abundant, so much so as in some instances to become a plague and a nuisance. Some of the species may be called domestic, the house-fly being an example. Flies have in all ages attracted observation from the numbers in which they sometimes appear, and in others from the terror they excite by their well-known power of causing the most intense annoyance both to man and animals. One of the plagues of Egypt was a "swarm of flies," probably mosquitoes, which came from the banks of the muddy Nile. Flies have no mandibles (jaws), but are provided with a proboscis and also several lancet-like organs. The common gnat (Culex pipens) has the parts of the mouth produced into a slender rostrum, half as long as the insect; the males have beautiful plumose antennæ. The approach of the gnat is known by its shrill hum; but its alighting on the face or other uncovered part of the skin is so light as not to be easily perceptible; it instantly pierces the skin with its fine lancets; these, it pushes by degrees quite in to their base, and while the creature imbibes its fill, it apparently envenoms the wound, which subsequently causes the most painful irritation. Records of their appearance in immense hosts in particular localities, even in this country, are not wanting; thus we are told, that in 1736 they appeared at Salisbury in such hosts as to resemble columns of smoke; and in 1766, in the month of August, they accumulated in incredible numbers at Oxford, resembling a black cloud, almost totally intercepting the beams of the sun. Such appearances are not uncommon in Suffolk and Norfolk, as I have been informed by residents in those counties; on such occasions their torment is beyond description terrible.

Neither heat nor cold seems to affect these tormentors of the human race. In Lapland they swarm in incredible hosts during certain periods of the year; there is neither rest nor sleep for the inhabitants, in-doors or out, unless the body is smeared with some unguent, such as grease, tar, or oil. In the eastern part of the world we well know that mosquitoes are a plague by day, and a "terror by night." Other species, belonging to the family Tipulidæ, are well known for the loss occasioned by their attacks on grain crops. The Cecidomyia tritici deposits its eggs in the corolla of the young wheat plant, in which the larvæ are hatched, and by their ravages frequently cause a considerable loss, if not an entire destruction of the crop. In North America, the ravages of the grain crops at times spread to an alarming extent. In Fitch's "Report of the Noxious Insects of the State of New York," are detailed accounts of their ravages; the larvæ of several genera are equally destructive. Species of the genus Chlorops have long been known seriously to injure crops. Linnæus mentions one, Chlorops Frit, which infests the heads of barley, causing an annual loss of not less than half a million of dollars annually in Sweden. The species of the genus Chlorops have, as the name indicates, green eyes, and may be seen frequently on the young heads of grain crops in the spring; but we must refer the reader to the work above alluded to, for a detailed account of the enormous loss occasioned to the farmer through the destructive

The Country Gentlewoman.

ORNAMENTAL TABLES FOR A SUMMER HOUSE.

OUR readers will find, on referring to pages 139 and 141, illustrations of an Umbrella Smoking Tent and Rose Temple Summer House. The introduction of these in or about a garden or a park, as the case may be, is almost a necessity, although it were for nothing else than for purpose of shelter from the rays of a sultry sun. We now illustrate two forms of ornamental tables (figs. 1 and 2) from the collection of Messrs Ransome & Co., Essex Street, Strand, as suitable furniture for such a smoking tent or summer house. Like most of the samples of modern furniture, they are of elegant construction, and they have also the additional merit of serving all the purposes that tables are generally made to do. Gentlemen in holiday time are engaged in several pastimes, and if, perchance, they stroll in company through garden or park, some one or other of the arbours that are planted down, generally in selected spots, are chosen for rest. If such an arbour or smoking tent be furnished with a chess table, there is nothing more pleasant than to spend a little time over a game. Continual conversation becomes wearisome, even the most exciting subjects become tame after both have exhausted their remarks *pro* and *con*, and a quiet call upon the intellect in the course of play, is a most agreeable as well as instructive diversion. We hail, therefore, the introduction of these tables, suitable as they are for either draughts or chess, as a move in the right direction, and would encourage their appearance as the proper kind of furnishing being useful in the highest degree, and ornaments to any summer-house, arbour, or smoking tent. They are not dear to buy, and from their being made of iron, and bronzed, they are durable and eye-pleasing, besides, from their solidity and weight, not easily overturned.

Fig. 1.—Ornamental Table, as a Chess Board.

Fig. 2.—Ornamental Chess Table as a Writing Desk.

LOOK TO YOUR GRAPES.

THERE are many Country Gentlewomen whom we know, who are anxious to have good information about their hot-houses and their gardens in general. We have seen Vines killed by the application of too much manurial liquid, and others recovering after a long illness, and becoming convalescent, as it were, after protest only. The advice given by a trans-Atlantic contemporary, *Germantown Telegraph*, under the above heading, is one that is perfectly applicable here, and being so, we quote it in full, with the premise, however, that tobacco, as all our British readers know, is not quite so cheap in this country.

Burning of the odds-and-ends of tobacco to be obtained at some stores, and at all tobacconists, for two or three cents per lb., is the best thing to smoke out all the early vermin from the Grapery; and just now is a delicate time to watch the Vines to see that they are free from these enemies. The smoking, however, should be done without regard to their presence. It is a protection. No one who knows anything about raising Grapes under glass, will water the Vines while *they are blossoming*. But when this is fully over, the large syringe should thoroughly sprinkle everything inside, including Vines, soil, &c., twice or thrice a-day. This must be accompanied with powdered sulphur, placed in the vicinity of every Vine, as a protection against mildew; and should mildew unfortunately make its appearance, the Vines themselves should be sprinkled with it.

Just now the out-door Grapes are liable to suffer from the steel-blue bug, which feeds upon the blossom, and leaves behind its progeny the small brown maggot that feeds ravenously upon the leaves, and seriously damages whatever crop is left by the bug. A solution of whale-oil soap and water is death to them, but the larvæ is difficult to get at, and the best way to destroy them is to get over the Vines and use the finger and thumb. Last year there were very few, and did but little damage, and there may be no damage from them this year, but the Vines should be carefully gone over, and not an hour should be lost in doing so.

There is also another insect which propagates its species in the out-door Vines, for which we have seen no name. This makes its nest in the the extreme leaves of an outer shoot, which is known by the leaf being gathered up like a purse. Open it, and one of the pests will be found. Some times we have found six or eight on a single vine.

THE

COUNTRY GENTLEMAN'S MAGAZINE

OCTOBER 1871

AGRICULTURE IN IRELAND.

THE Registrar-General of Ireland has just issued the summary of the Agricultural Statistics for the year. In one important branch these statistics are of an unfavourable character—viz., flax-growing. In a series of articles which we published a short time ago, we minutely entered into the question of flax-cultivation, and endeavoured to shew the profits that might be derived from its more extensive cultivation, not only in Ireland, but in Great Britain. It has been clearly demonstrated, we believe, that flax could be grown with profit in many localities. Flax-culture, however, appears to be losing its hold in Ireland. This year each of the Provinces exhibits a decline in the acreage under the cultivation of flax, as compared with last. In no one of the districts in Ulster do we find that any advancement has been made in the number of acres; on the contrary, each and all return a decline, which, in the aggregate, reaches to 33,224 acres. In 1870, there were in Ulster, 180,412 acres under flax, while this year there are only 147,188. Passing on to Munster, where the acreage was never heavy, we find that this year there is a total decrease of 1263 acres, as compared with 1870, the figures being—1870, 4192 acres; 1871, 2929. In Leinster, we find that the falling off this year, as compared with last, is about in the same ratio to the total decrease as in the other divisions. The total number of acres under the cultivation of flax is this year 3199, whereas in 1870 there were 4238, shewing a falling off amounting to 1039. In Connaught, where flax receives generally a wide acreage, we find a falling off of 2620 acres as compared with last year, the respective seasons being—1870, 6068; 1871, 3448. We draw the following conclusions, therefore, from the Returns in respect of the cultivation of flax throughout Ireland:—That flax was grown to the extent of 194,910 acres during the year 1870, while during the present year there are only 156,764 acres, shewing a total decrease, in 1871, of 38,149 acres. Of the entire number (1518) of scutching mills in 1870, 1409 were in Ulster, 39 in Leinster, 39 in Munster, and 31 in Connaught.

The Return also proceeds to enumerate the number and value of horses, cattle, sheep, and pigs for Ireland during 1870 and the present year. Of horses there is an increase of 4667 in favour of the present year as compared with last, the respective numbers being—1870, 532,657, as against 537,324 for 1871. In value there is little appreciable difference per head, the sums being, 1870, £4,261,256, and in 1871, £4,298,529. There is also an increase to be noticed this year as compared with last, under the head cattle, the number being 170,052; the value, £105,338. In 1870, the number of cattle in Ireland was 3,799,912, estimated at a value of £24,699,428, while

during the present year the total number amounted to 3,969,964, the value being £25,804,766. In numbers, and consequently in the value of the sheep in the country during the present year, however, the decline is considerable. During 1870 there were 4,336,884 sheep registered in Ireland, while in the present year the Returns only shew 4,238,066, a decrease of 98,818; the values were, 1870:—£4,770,572; 1871:—£461,873 —shewing a decrease of £108,699. Pigs are this year on the increase, the numbers being, 1870:—1,461,215; 1871:—1,614,190, an increase of 150,975; the value in 1870 amounted to £1,826,519, while this year it amounts to £2,017,737, an increase during 1871 of £191,218. The number and value of the stock in Ireland this year, therefore, compares very favourably with last, when the total was 35,557,775; this year, 36,782,968. The total increase of value this year amounts to £1,225,193.

AGRICULTURAL ASSOCIATIONS.

IS it possible that we can do better for our money than we are doing? is a question that is being anxiously asked by all agriculturists who desire to promote the general welfare of the profession to which they belong.

Agricultural societies, collectively, have an immense amount of money in their hands. A considerable portion of that is undoubtedly frittered away, in so far that its expenditure is attended with no beneficial or educational results. We particularly refer at present to the money disbursed in prizes at local shows. We find a large number of these at which the prizes given are so small that they are scarcely worth competing for; and, as a consequence, we find the same people and the same animals pocketing the little money and the same honours year after year. Were the various district show committees to throw their receipts into a common fund, they would be enabled to offer premiums sufficiently liberal to induce the best breeders and feeders in the counties to exert themselves to bring out their stock in a much superior condition to that we sometimes see them in at these local exhibitions. It should be understood, however, that we do not wish to see breeding animals brought out in the manner that some arbiters consider as perfect, if we may judge from their awards. We have over and over again protested against the over-feeding for show purposes, which has ruined many of the best stock in the country, and we are glad to note that our protest in this particular, in common with that of some of our contemporaries, has not been made in vain. In the course of the last two or three years, we have not heard so much of shorthorn cows and heifers being disqualified on account of their not producing calves; and symmetry in fat cattle is a point that weighs more than it ever once did.

But not alone could the money of local societies be so used as to bring forth more excellent returns, but certain improvements might also be made in connexion with associations of more extended area. Any one going the round of the shows, as we have occasion to do, will find the same animals over and over again. They are not always put in the same places in the prize-list, certainly; and sometimes the positions are so altered, one is tempted to the conclusion that judging, especially in shorthorns, is guided by no principle whatever. Individual preference and caprice for one particular strain, or colour, or coat, would seem to "rule the roast." But the same animals are at the various exhibitions, often the same judges, and yet the delightful formality is gone through of withholding a catalogue from the judges, in case that they might be influenced in their decision by the knowledge of the people to whom the animals belonged. As if they did

not know well enough, as a rule, every beast by head-mark! The sooner this presumption of ignorance in judges is done away with, the better.

Having spoken of our local and county shows, it might also be observed that more for the advancement of agriculture might be done by our National Societies than is accomplished. In the breeding of animals we appear to have arrived at a stage which cannot be much surpassed. Would it not be well to turn our attention to the improvement of the condition of the people who look after the animals which have recently been making such large prices? Better accommodation for Hodge and Hodge's family, and better education for his little ones, are matters which Agricultural Societies should take into more serious consideration than they yet have done. They have plenty of money, and judiciously expended in the way indicated, a race might arise competent to bring out better four-footed animals than ever their fathers tended.

CATTLE QUARANTINE.

UNDER the difficulties and hazards which now surround the importation of cattle from abroad, it is easy and somewhat consoling to take refuge under an accepted assurance that a system of quarantine would effectually annihilate the introduction of foreign cattle diseases. To detain a cargo until the time allowed for disease to appear has passed, or evidences have arisen which justify precipitate slaughter, naturally suggests themselves as feasible and effective proceedings. In the much cherished belief that we cannot do without store cattle from abroad —when, as in the present crisis, a political sensitiveness actuates a decided stand against an interference with free-trading—it is a natural and inevitable result that all shifts and expedients will be examined and utilized if possible, rather than the measure itself shall suffer reconstruction or even slight change. It has taken root in the public mind as a necessary proceeding—a desideratum which cannot be found in any other plan, and which, in short, can be supplied by nothing else. We cannot do without the animals, but as they are admitted to bring disease, we must try quarantine. Importation ***must*** not be stopped; therefore, we must adopt a system of rigid inspection and detention, to prove the safety of the stock and its freedom from disease.

All this is very well in the abstract, but there are very grave reasons why quarantine ought *not* to be attempted. Some point to the expensive nature of the system, but others declare, positively and unmistakably, that the expenditure would be thrown away, considerable loss and inconvenience occasioned, and the nation would not be one inch nearer the goal of safety at the end of twenty years; while Britain would be then established positively as a centre for spreading, in addition to receiving, as now, foreign cattle scourges.

It has taken a considerable time to induce the British farmers to believe that rinderpest, pleuro-pneumonia, small-pox in sheep, and the foot-and-mouth disease, are purely of foreign origin.

Many are sceptical on this point at the present moment, even after such convincing proofs of the frequent re-introduction of diseased animals. And whence this dogmatism, none can tell. But a still greater difficulty has arisen in convincing them that *all* these foreign pestilential maladies possess a period of incubation, which means a period of time dating from the opportunity when an animal was in the company of others infected, or occupied a stall or place where diseased animals, or matter from such, were present, and extending to the first appearance of the

disease in that animal. It is the time during which the disease is said to be "breeding" in the system. If the agricultural public, and those persons interested in cattle importations, whose interest is *not* to believe in foreign cattle diseases, would accept this act as final, the successful extinction of those now raging in Britain might be ensured, and the opportunity for future outbreaks by foreign introductions become very rare indeed.

Our insular position entirely forbids that disease shall be wafted to our flocks by winds from the continent; but railways and steamboats become the unerring means of conveyance, by bringing apparently healthy animals from flocks and herds whose members are diseased. Continental dealers know full well what the periods of incubation for each disease are—they have gained experience in these matters long before John Bull invited their stock to his shores. Those dealers know also that as soon as disease appears, it is best to sell off all that are not already visibly affected, for, as England requires store cattle, and, moreover, she is willing to take them *and bear the consequences*, they have no difficulty in placing the losses upon us to their entire satisfaction.

"But all this part of the transaction we are agreed to," says Agricola. "What have you to say against the system of quarantine as a means of detecting the existence of disease, and preventing its ingress to our farms? We can't do without store cattle, and we must have them where they are to be had." Proofs, in reply, are to be derived from already tested results. Quarantine principles would require a most extensive staff of officials, well versed in the methods of proving the soundness of animals; their operations occupy a great amount of time, and must necessarily be extended over the period of incubation, which, in case of pleuro-pneumonia, being six weeks, will enable any one to form an idea how much trouble a cargo of animals would occasion. But such a staff would be enormously expensive, and besides, no matter how large it might be, it must always be inadequate to the desired ends, as cargo after cargo arriving would bring in additional work, and a community of clerks would be insufficient to inscribe the various records of necessity arising. If cattle, on arrival, found healthy to all appearances, are to be sent inland at once, then, as now, all insecurity is done away with. Quarantine, to be properly carried out, must ensure the detention of stock; but then we incur the grievances already named. Yet there are others. Disease is not always found on the landing of stock. The period of incubation has not expired, and the animals are put into quarantine sheds; others, arriving daily, are also put into sheds on the same premises, and the place becomes a vast cattle-lair. At the end of a few weeks, or less, one of the first cargo shews signs of dullness, and in twelve hours pleuro-pneumonia, or foot-and-mouth disease appears. The whole of the animals in the sheds are then infected, and liable to carry the disease wherever they go. But judge of the time that must expire before any cattle can safely go out; consider the amount of operations now added to the quarantine officers' duties, and the expenses added to the original cost of the stock; and where are fresh arrivals to go? All ports where they are admitted under quarantine regulations would be alike; they would be full, propagating disease, producing greater mortality, for the animals may not be moved, and, meanwhile, the population is denied animal food. All this has been already tested. The absurd Order compelling owners to retain healthy animals in buildings where others have been affected or have died from contagious diseases, has converted cow-houses into so many pest manufactories.

Those who sue strenuously for quarantine are scarcely aware what it really is where cattle diseases are concerned, and a population is clamorous for meat. Inspection of store stock at ports, only under certain conditions, is useless. Rather let the expenses be spared, and importation be confined to *fat* cattle, which can be slaughtered at once, and while the population is being fed, we can satisfy ourselves the native stock is *not* being menaced any further.

*THE FARMER'S POSITION IN THE COUNTRY.**

By Mr G. F. H. Rowe.

ANY one who takes the trouble to examine impartially the several strata —if I may be pardoned for using a geological and common expression—which comprise our entire population, and their relative positions to each other, must arrive at the conclusion that those of the community who are engaged in agriculture form the stable base of the national pyramid of Great Britain. In every prosperous country the same arrangement exists. Across the Atlantic, the possession of unbounded resources in land has secured for the Great Republic of the United States an almost unrivalled advancement. An agricultural population is almost invariably loyal, peaceful, and averse to convulsive agitations; for these are hereditary traits, descending with slight diminutions from generation to generation. There have been times when their value has become felt in the United States. Contrary examples may no doubt be quoted both in Europe and elsewhere; but reference is here made to the rule and not its exceptions. Now, it may be argued that commercial intercourse has given Great Britain the larger part of its enormous wealth, thickly peopled whole districts, adorned the country with innumerable palatial dwellings or "stately homes," and offered a fruitful stimulus to latent energies. All this may be granted, and it represents a very glowing picture of facts; still it would be unsafe for the prosperity of Great Britain to be hinged on commerce. A capitalist whose stock chiefly consists of the circulating medium—I say this, having due regard to the cost of the buildings and machinery for the purposes of production—may quit and often does leave this country without inconvenience, when adversity begins to dawn, in order to invest his hoardings profitably in a foreign clime. Land, however, is a fixture; and its owner, although a participator in the untoward prospects that shed a gloom around, must necessarily, in the majority of instances, be immovable also, or else be prepared for absolute ruin. Thus it follows that the agriculturist is instinctively jealous for the prosperity of his country, and is induced, by powerful motives, to watch its interests, and to promote them. For the very same reasons, the British Government ought to be vigilant in furthering the farmer's welfare. Something is undoubtedly done with that intent from time to time, but with a half-heartedness that well nigh destroys all sense of the benefit; anyhow, farmers are less grateful on that account than they otherwise would be. Now there is a cause for this semi-negligence and disparagement of the farmer. In its infancy commerce enjoyed the patronising care of the sovereigns on the throne, and as one result of its development, its influence displaced that previously exercised by the tillers of the soil. And it is partly because Parliament now wrongly imagines the nation, as a whole, to be dependent but in a small degree on the farmer, that the feelings and desires of the latter remain comparatively unheeded, and his petitions virtually disregarded. Can the nation afford to adopt an attitude of indifference towards the agricultural situation? This has been tested a hundred times. Witness the prevalent anxiety about the probable results of the home harvest, an anxiety penetrating into commercial circles, where it is calculated with precision that a partial or complete failure of any crop, and how much more of crops in general, must tend to increase prices, and to affect the selling rates of most commodities. And yet place in juxtaposition the treatment meted out to the farmer, of which we have an excellent exem-

* Paper read before the Carmarthenshire Farmers' Club.

plification in the circumstances surrounding the question of local taxation.

THE GRIEVANCES OF THE FARMER.

A clearer case of injustice could not be adduced than the infliction of the whole burden of local taxation on land. Colossal fortunes had not been heaped up to an appreciable extent in the reign of Queen Elizabeth, when the relief of the poor by local taxation commenced, so that the legislators of the middle ages merely adopted the idea that it was a duty of such wealth as was discernible to sustain the poor. This was but the reaffirmation by law of the principle that was integral to the feudal system, when the owners of estates were under obligation to sustain the indigent amongst their vassals or serfs. The theory was that property, humanly speaking, brought the poor into being. When, therefore, a new species of property has been originated in the country, viz., personalty, a most fertile agency, moreover, in the production of paupers and pauperism, it is only just that it should contribute its quota towards the expenses of the Poor-law, and not selfishly impose the entire charge on the soil. The justice of the farmer's case has been laughed to scorn; the whole of the twenty millions and more of local taxation have still to come out of his pocket. And for this agriculturists have themselves much to blame. However active they may be now, they have not been energetic in the past; their Chambers of Agriculture and Farmers' Clubs are modern institutions, and have only recently brought pressure to bear on the Legislature. A retrospect of the last forty years will evidence how many changes have been procured by means of organized associations. Scarcely a single innovation of any moment can be mentioned which is not due to such agencies either in the whole or a large part. There is one of those changes in which the cultivators of the soil were deeply and closely concerned—the repeal of the Corn-laws. Avoiding an entrance into the merits of a controversy which raged with fury for seven years, and which has been in all probability lastingly settled, it may be affirmed without chance of contradiction, that the repeal of the Corn-laws in 1846 ensued from the exertions of the Anti-Corn Law League. Whether Mr Cobden and his fellow-lecturers were right or wrong, they succeeded in accomplishing their object by sheer dint of persevering agitation. If farmers are to succeed now in obtaining a recognition of their just demands, and in securing a redress of grievances, they must proceed in like manner, and emulate so notable an example. But they will never succeed satisfactorily until the Cabinet includes a Minister whose functions will wholly relate to agriculture. Why should there not be a Minister of Agriculture for Great Britain? To protect the interests of commerce, a Board of Trade has been established; and therefore in soliciting a Minister of Agriculture, agriculturists cannot be accused of preferring a preposterous request. There are some who maintain that the present Board of Trade works unsatisfactorily. It would be out of place, nor would time permit me, now to anticipate and answer the objections that may be invented against the appointment of a Minister of Agriculture. Amongst the foremost would probably rank the plea that a salary must be paid him, in proportion to the official income of other members of the Cabinet, amounting perhaps to £2000 a-year. Now, at all times the labourer is worthy of his hire, even if he be a Minister of Agriculture. Notwithstanding the necessity for national economy, it is very unlikely that Great Britain will be plunged into bankruptcy by the suitable remuneration of such a minister. Farmers contribute very liberally to the National Exchequer, and to expend something in return on their interests is only a fair requital. France has a Minister of Agriculture; and Great Britain ought not to be behind her neighbours. But if a Minister of Agriculture be instituted, his efforts ought to be supplemented by the ramification of Chambers of Agriculture and Farmers' Clubs throughout the kingdom. Here, again, agriculturists may advantageously extract a leaf from the books of their commercial fellow-countrymen. In the majority of manufac-

turing towns of importance in England, particularly in the northern and midland districts, Chambers of Commerce are to be found. The meetings are held at regular intervals, and "business" is the watchword of the members. Tariffs are discussed with commendable intelligence and zeal; no time is wasted in conversational gossip; and petitions are forwarded to Parliament with a promptitude that cannot fail to tell in the long run. To agriculturists at large, I would say, "Go and do likewise;" and "*Nil Desperandum*" be engraven on your hearts.

LAND TRANSFER: THE TRANSIT OF CATTLE.

The farmer's position in the country is affected by several grievances, which Chambers of Agriculture and Farmers' Clubs could help to remove. Two of them will be cited for illustration. When an industrious tenant-farmer has contrived by thrift and unflagging industry to save a few hundreds of pounds, he naturally begins to aspire to change his position from a tenant to a landowner. Shakspeare condemns ambition to be a sin, but at least this kind of ambition is a very pardonable fault, and one that even deserves encouragement. The tenant learns that a certain farm is for sale, which will suit his purpose. But when he comes to buy, he is compelled to pay a heavy price to some lawyer for making a conveyance before his title can be considered complete. This is an oppressive interference by law. A commercial man can purchase £10,000 worth of wool, iron, or any other raw material, at the extra expense of a few coppers, an invoice only being requisite; but if a tenant-farmer acquires a few acres of land costing £500, the chances are that he will have to pay a purchase-bill when he receives his deeds, amounting to £20 or £30. The time has arrived when a more simple and inexpensive, and still equally effectual method of registering the sale and purchase of land, ought to be devised and sanctioned by the Legislature. The second illustration relates to the sufferings endured by cattle in their transit by rail. Huddled together in a truck, in nearly the same fashion as the unhappy victims of the Black Hole in Calcutta, the animals are exposed, perhaps, to a scorching sun and a perpetual torment by the flies, for twenty-four hours without cessation. Often for so long a period they remain without water, and suffer intensely from thirst. Need it be said, that the constitution of an animal is seriously injured by such treatment, and its value in the market, either for farm stock or the shambles, greatly depreciated? Railway companies ought to be forbidden to carry cattle beyond a certain distance without supplying them with water, under heavy penalties. A law to that effect, however, will be postponed for a long time, unless associations such as I have the honour of addressing move in the matter. Recent legislation is calculated to affect materially the farmer's position in the country. By the Elementary Education Act of 1870, the scholastic training of every child in England and Wales is intended to be secured. In time, the employer of agricultural labourers will experience the effects. Whenever the mental faculties of a human being are developed by culture, a higher degree of self-estimation is liable to be generated; and once our agricultural labourers begin to be so affected, they will insist on a more liberal scale of wages. Therefore, before long, farmers must expect to find this call made on them. Capital and labour have been antagonized in England for thirty years. This antagonism, which spreads like contagion, threatens to everwhelm the agricultural districts of the country.

THE USE OF IMPROVED MACHINERY: EDUCATION.

If a demand for increased wages be made, tenant-farmers will be the first to feel it, and acutely. The immediate future promises to be favourable to such a demand, because, by the gradual opening out of the mineral resources of the Principality, the pressure in the labour market will be much relieved, and it will be proportionately less easy to obtain farm labourers; consequently they will command the terms on which they shall be hired In anticipation of this possibility, all who hear me will mentally realize the urgent

necessity for extending the use of machinery in agriculture, rendering the farmer less dependent on his *employés*. At first sight, this in turn, may seem utopian to the small tenant-farmer. His means present an insuperable hindrance to the purchase of machinery; but what a single purse cannot afford, may be within the grasp of a number of purses combined. The Carmarthenshire Farmers' Club, for example, might, when the time arrives, purchase suitable machinery, and let it on hire to various of its members. Nor would the speculation be unremunerative. Farming has now become a science, and is recognized, moreover, as not the least of the sciences. In an age of progress, it is natural that the method of tilling the soil should change and improve. I am not about to say whether the eight-course, six-course, or four-course system in the rotation of crops is best; but I do affirm that it is now seen the powers of Mother Earth cannot be stimulated without the expenditure of a larger amount of capital than has been customary. Scientific knowledge is essential to the most successful farming. He who knows the composition of the soil owned or rented, the primary elements and their proportions composing the manure at his command, the properties which will feed the crop he wishes to grow, must necessarily employ his capital to the best advantage. In other words, a farmer, in order to be successful, ought to possess a familiarity with chemistry. Need I state that the growth of a plant is caused by the absorption of certain contents of the soil, and that a living plant is but a transformation into another and vitalized compound of certain elementary atoms coalesced in the surrounding earth? It is almost too late in the day to insist on the close connexion subsisting between agriculture and chemistry—the plea is stale. The cry for technical schools or colleges swells on every hand; and if farmers are true to their position they will add their voices to the chorus.

THE FARMER AND GENERAL PROGRESS.

The rapid growth of population on the island leads me, lastly, to inquire how the farmer's position is likely to be affected thereby. During the last thirty years, commerce has expanded in a manner without parallel, and has drawn the people as it were within its friendly embraces. The multiplication of woollen, worsted, and cotton mills, with the incessant demand for their productions, has proved a profitable field for the investment of capital, and has swallowed up much that otherwise would have competed for the possession of land. Perhaps in this way they partly explain the fact that whereas, in 1770, there were 250,000 landowners in the United Kingdom, now there are less than 30,000; for commerce often pays 20 per cent. and more for the use of money; while land can with the greatest difficulty be made to return 5 per cent. on the outlay or the capitalized value. Unless our exports continue to augment in equal ratio to the population, or an emigration to foreign lands or the colonies takes place, a keen competition for the tenure or possession of land will commence, and it will follow that rents will rise. A slight relief would be afforded by bringing under the plough tracts now uncultivated. In Wales, I find from published figures that 2,230,840 acres are put down as untilled. But it must not be presumed that this is accurate, because no allowance has been made for patches and whole districts covered with buildings. Again, in these figures there is included barren soil, mountainous, and hardly worthy of being reckoned as arable. But making all allowance, it is indisputable that no small section of the Principality is not and has not yet been farmed. Including England and Scotland also, the quantity is immense and reaches millions of acres. I am far from disputing a landowner's right to indulge his choice and keep a portion of his estate as game preesrves. Interference by law with that right must absolutely be condemned as prejudicial to the public welfare. But in the event of a considerable amount of capital being disengaged from commerce, the landowner will find it a profitable speculation to bring his game-preserves into the market for sale. And that will proportionately relieve any prospective pres-

sure of competition for land, and diminish the chances that rents will tend upwards. Should the farmer's position be rendered more uncomfortable, either by an increase of rents or an increase in the rate of wages, it is not difficult to foresee the consequence. Small tenements will cease; and small holdings will be amalgamated; otherwise, farming will not pay. The growing use of machinery, and the disposition to expend more capital by the agriculturist, alike point to a similar result. Whatever may be the future of the tillers of the soil, for the present they have no reason to despair. Theirs is an antient, an honourable occupation. The sons of the soil have in ages of yore firmly laid the foundation of our island's fame, affording the present and future generations a noble ancestry on which to gaze with admiration, and meditate.

HINTS FOR THE FEAST OF ST PARTRIDGE.

IT is highly desirable," says a writer in the *Daily News*—and his hints are as applicable to pheasants, and indeed throughout the whole shooting seasons of the year, as they are to the plump little birds that delight to esconce themselves among the broad leaves of the Brassica genus—"that those who take part in this festival should not celebrate it with maimed rites. For this purpose a certain class of sportsmen should bear in mind that birds only are to be hit in the course of the day. Neither markers, pointers, or setters should be considered under the head of game by the fowler when a-field. The guests, and the host of the house at which a tyro visitor for the First is entertained, should be regarded as so far exempt from the chances of being slain or wounded that some care should be exercised on their behalf by persons whose guns are liable to unexpected explosions. The head of any friend or acquaintance sighted nervously on a line of fire with the covey is always in danger, although the young or the untried sportsman may not think of the fact at the time. A breechloader can perforate a common English peasant engaged to assist in the great business of the hour at any distance, from 1 up to 75 or 80 yards. The effect at the short range is probably instantaneous death; at the longer range, the result may be simple blinding for life, according to circumstances over which the sucking or 'prentice fowler has no control. Occasionally, a marker struck at 80 yards may escape with a mere peppering, which causes him to execute a most diverting *pas seul*. It might be judicious or charitable for the inexperienced friend to whom these hints are offered, to ascertain as early as possible in the morning who are the married men in the party. To wing an old bachelor may be awkward, but to bag or cripple the father of a family is a proceeding about which there is an air of thoughtlessness and levity. Agreeable re-unions on the First have, before now, been abruptly broken up by the insertion of a small proportion of a cartridge into the leg of the squire himself, who, in an evil and smoking-room hour in town, had invited the operator—who apparently took his host's gaiters for ground game—for a week's shooting. There are few men so fond of shooting that they like to be constantly obliged to look into the barrels of their neighbour's gun. This ought to be kept in mind by the neophyte, who, from the mode in which he carries his weapon, appears to think that whoever comes near him is anxious to satisfy himself by personal inspection as to the exact bore of the loaded piece. Nor is there anything gained, when following your friends over a hedge, by turning the gun on at full cock towards the back buttons of their coats. When jumping from the hedge your

self, or sliding down it, there is no object—with which wild poultry can be associated, at least—in coming on your feet with your breech-loader directed with a jerk upon the group of featherless bipeds who are waiting for you to join them.

A partridge to our young sportsman appears to explode into little bits when first flushed, or to resolve itself into a Catherine Wheel, like that represented by Leech in his famous picture of Mr Briggs amongst the pheasants. The delusion, or illusion, however, has so strong an effect on the tyro, that he tries to arrest the transformation, as it were, by firing at the bird the instant it is off the ground. There could be no greater mistake—as a dog often finds to his cost. It is better not to pull the trigger until the gun is brought fairly to the shoulder, and that manœuvre is inconsistent with the hysterical snap which follows on the spring of a covey from the weapon of the impatient or the excited sportsman. The latter should also remember that he has far more chances of bringing down his quarry at thirty than at ten paces. The partridge will neither burst of his own accord, nor vanish into thin air, if permitted to go a little farther. Indeed, he generally retires in excellent order when a wild atttempt is made at him at close quarters, but by waiting until he has attained 30 or even 40 yards, there is the satisfaction of feeling that, if not missed outright, there is a prospect of his receiving an odd pellet from the charge, which will probably result in his dying in a ditch, attended in his last moments by a weasel or a hawk.

If you are placed next a good shot, contrive as often as possible to fire at the same time that he does. When the bird is allotted to him, look amiably resigned. As a general rule, reverse the spirit of the order in battle —to aim low; aim high, for several reasons. The height of a setter from the ground is not much, the human stature is also below the average level of partridge flight, so that no sportsman-like object can be well attained by sending the contents of your cartridge skimming a couple of feet over the tops of the turnips. Low firing, as understood by our beginner, often consists of simply smashing a mangold-wurtzel a few yards off. The mangold does not count in the day's bag. High firing is comparatively a safe proceeding unless the markers are on hazardous elevations; but it is difficult to lay down any specific regulations which would ensure comparative immunity from extreme peril for these officials in places where a few of the company are enthusiastically fond of shooting, but quite unaccustomed to it.

We are almost afraid to venture upon any suggestions to old sportsmen. The veteran is ever, and properly, impatient of advice. Besides, the man who cannot hit seven partridges out of ten that he fires at on the First, is not likely to profit much by our writing. Nothing but steadiness is required for the work. The birds, if approached at a proper hour, will wait to be kicked up, and the old cock ought to be brought down like an old hat, to start with. Don't take your eye from the bird that catches it first, have at him determinedly. The instant you let drive at him, remember you have a second barrel, and that a clever practitioner should perform with the right and left as deftly as a pianist with both hands. There is very little credit, indeed, in taking a single bird out of the lot when the covey is well within range. It is quite another matter late on in October, when the birds are thin and scattered, when they are wary, and strong on the wing. On September days, also, if the weather should be bad (say wet over night and a high wind next day), partridge shooting may alter its conditions completely. Coveys deprived of the old birds as soon as possible will be found easiest of approach. We believe in "rogue" partridges—single brutes that will dart under your nose over a hedge, and with the rustle of their wings call up covey after covey in the fields which you had designed to beat. There is nothing for it, under such circumstances, but to mark down the flushed lots.

A good luncheon is generally followed by bad shooting. Hock consumed until it is resolved into *hic* tells for the birds and against the guns. Moderate refreshment, of course, is requisite and useful. The cigar

ards (one and only one) seems to cool the excitement, perhaps naturally con- ıt upon the first day's campaign. d marches on this occasion may be ıtrongly condemned. To make a toil ıleasure is often a vice of an athletic ɜhman. It may be as well to leave of the coveys untouched at the com- ɜment of the season. There is plenty ɔrt to be had without the massacre of ıllow innocents who are not much big- ıan quails, and whose tender bodies are ɜy riddled and torn as the carcase of oft-fleshed landrail. There are few ɜ more unsportsmanlike than putting partridge nursery, and when the fledg- flutter separately into the holes and rs of hedges, marching to them with a ng old pointer, or having them poked ith a stick from their retreats. The nts of the poulterers' shops in London ıe second day, always display a sad ning on the hooks of partlets cut off in loom of youth before they had time to ɡthen on the soil, and were fit to be the y of other than chicken-butcher fowlers. ɜ is no skill or fun in compassing the of these infants, and their doom should e pronounced except upon very much tocked ground. The thinning should ıence with the lusty and the ripe birds.

A word in parting to our friend who enters turnips or stubble for the very first time. We most emphatically commend to his consideration the observations at the head of this article. He should have it impressed upon him that once the trigger is pulled it is impossible to recall the charge which goes out upon its mission at the explosion, so that every precaution should be taken antecedent to an act of dog slaughter or markercide, as the case might be. Prevention in such circumstances is decidedly better than cure, the extraction of small shot from the human frame being perhaps one of the most uncomfortable operations of surgery to which the living subject can be liable. For the rest, let the young sportsman prattle modestly, if at all, of his exploits. Let his talk not be *perdrix, toujours perdrix*, what time the short interval is allowed before coffee where he is entertained. His deeds should speak for themselves, let us hope not with a tragic, solemn interest, but with a reasonable assertion to a repute for prudence, if not for skill, for an amount of discretion which has ensured him at any rate from the disagreeable consciousness of having to pension a keeper on crutches for the sake of the momentary pleasure derived from firing, where driving up is allowed, indiscriminately into the brain, not of the birds, but of the beaters.

THE HARVEST IN SOUTH DEVON.

WE have received the following interesting notes about the harvest ıth Devon from a thoroughly competent ırity. He seems to be quite aware about which he is writing, and that is more than be said of some of the self-constituted ıorities whose adumbrations we have re- r listened to. He says :—

e crop which has just been gathered ɜ likely to yield a result considerably · an average. As regards the wheat, this was foreseen from the appearance of the fields throughout the spring and summer. The cold ungenial spring and the unusually wet summer both acted much against the wheat crop; but the main cause of the failure lay in the unfavourable condition of the land at the time of sowing the seed. It was very generally remarked by farmers at that time, that their land was in fine condition for barley, but they feared it was too light and friable for wheat. The result shewed that

their fears were well founded. The wheat plant failed to find in the loose soil that firm seed-bed which is most favourable to its development, and the severe frosts of last winter coming upon a weakly plant made it necessary for hundreds of acres to be ploughed up and sown to another crop.

Hundreds of acres more might have been treated in the same way, with greater advantage than has been obtained by reaping a very poor crop of wheat, such as has been seen this year in a much larger number of fields than usual.

The great drought of 1870, and the consequent failure of the root crops—the consumption of which on the land by sheep is believed to be the best preparation for wheat on soils which are dry and sound, and have not too much clay in their composition—is the principal cause of the unfavourable state of the land at seed time; and the efforts made to secure green crops by re-sowing, only increased the evil they were meant to cure, as the re-working the soil in the dry hot weather rendered it looser and drier than before.

A thin and weakly crop, of course, encourages the growth of annual weeds, and this year has witnessed that most unsatisfactory sight for a farmer, viz., thousands of acres of wheat, red with poppies.

Where clover has been sown with the wheat, the stimulating effect of the rains, which began to fall about the middle of June, caused the former to overgrow to an extent scarcely ever seen before; and its presence in the sheaf during the rains of the middle of August has interfered greatly with the securing of the wheat in good condition.

The appearance of the barley crop during summer was altogether more promising than the wheat, and if the weather had permitted its being harvested without rain, the result might have made up to the farmer the deficiency of the wheat crop. But as clover is more generally sown with barley than wheat, so the barley crop is this year much injured by its presence. This injury is due mainly to its quality for malting. The clover having once become soaked with rain after being cut, is exceedingly difficult to dry, and the consequence is, that much of the crop is stained, and, it is to be feared, has been put together in poor condition.

The hedge-row timber which is to be found on many estates in this part of England, is a most fatal hindrance to the successful harvesting of corn in showery seasons; with an overgrowth of clover in the straw which has once become thoroughly wet after cutting, it is next to impossible to dry it in fields surrounded by trees. An unaccountable perversity on the part of many landowners has led them to plant the sides of the hedges with the sorts of timber which the timber merchant declares to be almost valueless, such as the worst sorts of elm and sycamore, &c.

These, whilst being unprofitable to the owner, are far more destructive to crops both before and after cutting, and to green crops of all kinds, than the better sorts of timber. Instances are frequently seen of injury done by inferior timber—in one year, more than equal to the value of the timber itself. This surely is an unsatisfactory feature as regards the management of land by its owners. That they should persist in destroying the common wealth, which the produce of the land, the food of the people, most assuredly is to a certain extent, is what strengthens the voice of those who demand a change in the land-laws of this country. The landowners are in the habit of saying that the land and its produce are simply private property, to be dealt with according to the will of the owner; but the people themselves see and feel, that although a man may be allowed to throw his sovereigns to the winds or into the sea, the land upon which we are all born, and upon the produce of which we must all live, if we are to live at all, should be so held and so used by its owners, that its produce shall be allowed to approximate itself as nearly as possible to the requirements of its increasing occupants. The great drawback to this result in South Devon is comparatively useless timber and rabbits. Much of the deficiency of the present wheat harvest might have been prevented by a more liberal course of management by

the cultivators. But before this can be reasonably expected from them, a more liberal treatment must be accorded to the occupiers by the owners. Farmers cannot bring themselves to invest largely in manure and oil-cake, &c., and manage the land in a generous and liberal spirit, with the knowledge that the rabbits are to have the first and the best of the crop, and the useless hedge-row timber to injure the remaider.

The owners have so managed in times past, as to secure their game and timber from the incidence of local taxation. How they justify themselves in so doing, is a puzzle to a man who is not a landowner. It may be hoped that they will see, in the course of time, and before it is too late, that their true interest lies, not in separating themselves and their property from their best customers and friends, viz., the consuming public of this country, but in trying to meet the matter by removing all they can of the existing obstacles to increased produce and good harvests.

"TOO TRUE."

THE following article, which we quote from the *Daily News*, is applicable to agriculturists as well as to the general community, upon whom, of course, farmers are dependent.

In a newspaper which professes to be be devoted to the interests of ladies exclusively, but which contrives to unite the agreeable with the instructive, in so successful a manner as to be often found, when wanted, in the furtive hands of a husband, a brother, and sometimes of a lover, a friendly controversy has for some time been raging, and is apparently not yet exhausted, on the subject of the expenses of housekeeping. Miriam wants to know if ribs of beef ought to be 11½d. per lb., and whether ribs or sirloin be the cheaper joint. Lady Jane is anxious to learn if "if any of our readers manage to make their poultry pay, what is the most rapid way of fattening young chicks, and whether it is not cheaper to purchase eggs than to produce them?" Mabel, with a more serious air, complains that she has only £150 per annum allowed her to spend on all the various items of housekeeping, and that with this she has to satisfy her husband, herself, four growing children, and three hungry and particular servants. Is the thing feasible? The question provokes a perfect hurricane of replies. "Worsted Stockings" writes to say that she would be delighted if she had but two-thirds of the amount. "Fantail" protests that how "Mabel" does it, is a conundrum no fellow can understand; whilst "A Mother of long standing" explains at length, and with much minuteness, how this particular coat is to be cut, according to the special amount of cloth. This opens up the whole question of breakfast, luncheon, and dinner, and every man's castle is turned inside out for the edification and instruction of perplexed housewives. The conflict of opinions is remarkable. One lady—what a treasure she must be!—affirms that she can keep her household, all round, on 10s. a-week per head; whilst a more liberal correspondent, with an air of economy rather than of innocence, informs her friends that 1½ lb. of meat per day for each person is the proper allowance. There are as many opinions as women.

All this divergence of view is easily explained. Cost may be fixed; but expense is always relative. We know what is the value of the widow's mite when it comes to giving; and its value is not diminished when it is a matter of spending. No correspondence like that in question can be as useful as it may be made, unless it be first understood what is the income to be dealt with, and the inquiry then be limited to the most

sensible and frugal way of spending it. What would be recklessness in one case might be only proper expenditure in the other; and the same act might carry a charge of extravagance, which, in altered circumstances, would positively wear the complexion of meanness. Pope reminds us that it was never agreed where is the Extreme of Vice, any more than where is the North and the point beyond which you get amongst the Hyperboreans. At York, the North is at the Tweed; in Greenland, at "Zembla." It is just the same with economy or extravagance. Who is to draw the line? It varies from age to age, just as it shifts from rank to rank. Our ancestors, could they see our present habits, would deem us monsters of wastefulness; but a return to their simplicity, our wealth remaining what it is, would convict us of miserly affections. But rich, comfortable, needy, and absolutely poor, all live together in one generation; and the wants and expenses of one section afford no help or criterion for the members of another. Perhaps there is no infirmity of which people more often accuse each other than of meanness or its opposite; but it is the old story of where is the North.

> No creature owns it in the first degree,
> But thinks his neighbour further gone than he.

It is only when you know what a household has to spend, that any useful rules can be laid down for the guidance of its Chancellor of the Exchequer. A world in which there was something like an equal distribution of wealth would be a better one than that we at present happen to inhabit; but so long as we continue to act upon a different principle, we must forbear from making the limits of one income dictate the application of another. "Is it not shocking," one may hear asked occasionally, "that Mrs So-and-so spends £1000 a-year on her dress?" The inquirer perhaps spends only a-tenth of that amount, possibly only a-twentieth; but it is just possible that £100 a-year spent on dress seems as amazing a sum to a labourer's wife as £1000 appears to her who exhausts the smaller allowance, and perhaps feels pinched in doing so. Housekeeping expenses must be measured in the same way. We know that, as a fact, a Dorsetshire household—and not always a small one—is brought up on 10s. a-week. It is therefore obvious, that it is even only just above that miserable point, that a mercilessly logical inquirer could begin with his charges of luxury and wastefulness. For if not there, where then?

Given the income, shew the way that will make it go the furthest. That is the question. It is not, however, the question in most people's minds. On the contrary, the problem they are perpetually striving to solve is how they shall spend, say £600 a-year, so as to make it bring, or appear to bring them all that is obtained by people who have £1200 a-year; or £1200 a-year so that they may not lag behind folks with £2000. We need scarcely say that the circle will be squared before such a problem as that is solved satisfactorily. A desire to be "respectable," in the best and proper sense of the word, is a worthy ambition that may be recommended to all; but it is something very different from the wish, unhappily so common, to "make an appearance." To be respectable where there are scanty means, demands judicious thrift and a skilful application of savings. To make an appearance, too often involves meanness as well as debt, and that stupid, vulgar operation known to familiar English, as starving the belly to adorn the back. And the worst of it is, that whilst English people are perhaps more prone than any others to make exorbitant sacrifices for outward show, they are at the same time the persons least initiated in the arts of domestic economy. A correspondence in a lady's paper, or elsewhere, which would bring all the monstrous aspects of this truly national defect to light, would be of quite as much use as inquiries into the proper allowance of beer for domestics, or the current charges of laundresses. Spasmodic attempts at cleaning out that Augæan stable—the British kitchen—will prove a poor substitute for that steady and habitual system of wasting nothing, and making the most of everything, for which we seem, as a nation, to have not

so much an incapacity as a positive aversion. There is nothing akin between frugality and stinginess; indeed, they are generally strangers. On the other hand, a horror of waste can be accompanied with a hearty open-handedness. It has often been observed that in England poverty is a crime; and if it always arose from want of thrift, it ought to be regarded as such. The penalty, however, should commence with the cause, and not when the result has become too patent to be missed by any person of average ability. It is difficult to say what class is, in this respect, the more guilty.

THE SCOTCH SALMON FISHERIES.

THE Report of the Special Commissioners appointed to inquire into the effect of recent legislation on the Salmon Fisheries in Scotland, has been issued. That Report contains some valuable information gathered by Mr Frank Buckland, Inspector of Salmon Fisheries for England and Wales; and Mr A. Young, one of the Commissioners of Scotch Salmon Fisheries, who paid a visit to the greater number of the rivers, and had personal interviews with District Boards and other corporate bodies north of the Tweed.

The Commissioners are of opinion that, on the whole, recent legislation, as embodied in the Acts of 1862 and 1868, has been beneficial. They think, however, that further amendments may be made. The evidence obtained by the Commissioners shews that considerable differences of opinion exist as to the periods suitable for the close season, the times varying from 120 to 247 days. The time presently fixed is 168 days, but the terms of the Act specifically fix that number of days, allowing of no longer or shorter period. The Commissioners propose that the words of the Act should be altered so as to read that the close time "shall always be *not less* than 168 days."

In connexion with the annual close time, the Commissioners distinctly recommended that no fish caught during the extension of time for rod fishing ought to be allowed to be sold or exposed for sale, as otherwise a cover is given for the illegal netting of salmon during the rod season, fish so caught being sold as rod-caught fish. The Commissioners strongly recommend the extension of the weekly close time. The present close time is 36 hours, from 6 P.M. on Saturday to 6 A.M. on Monday. The Commissioners decide that it ought to be increased to 48 hours, or from 6 A.M. on Saturday to 6 A.M. on Monday, or if 48 hours be thought too great an extension, they suggest that it should extend to 42 hours, that is, from 12 noon on Saturday to 6 A.M. on Monday, which is the present weekly close time in England.

The Commissioners deal with the subject of bag-nets and stake-nets. They give their approval to a recommendation that, when stress of weather prevents the owners of bag-nets from observing the weekly close time at the statutory period, they shall be bound to slap their nets in conformity to the bye-law for a corresponding number of hours at some other time in the same week. They notice a recommendation by Provost Mann, of Nairn, with regard to stake-nets, that their weekly close time should be by tides, and not, as at present, by a fixed period of hours, that is to say, that it should commence with the first low-water after the statutory period for the commencement of close time, and that the 36, 42, or 48 hours shall count from that low-water. The reason for the suggestion is, that frequently, at the hour fixed for the commencement of the weekly close time, it is high water, and a heavy sea is running, so that the tacksman is not able to slap his net without danger, whereas, at low-water he can always do so. The Commissioners approve of the suggestion, but they observe that if it is to be adopted, there must be careful watching, to ensure that the tacksman observes the weekly slap for the full statutory period.

The Commissioners distinctly admit that it would be unadvisable, in the public interest, to abolish fixed engines in the sea for the catch of salmon. They consider that these nets, when placed very near the mouths of rivers, are not only unfair to the upper proprietors, but are actually injurious to the general interests of the fisheries. They are inclined to recommend, therefore, that no stake or bag nets should be

allowed within half a mile of the mouth of any river, while in some cases they state that it would be advisable to remove them to a distance of 2 miles. They further recommend that *no fixed engines* should be permitted between the mouths of rivers that fall into the sea so close to each other as the Ayr and the Doon in Ayrshire, and the Dee and Don in Aberdeenshire. Further, they suggest that the junction of stake and bag nets should be prohibited. Further, they recommend, what is very important, "that the number, position, and extent of the existing fixed engines should be officially registered, and that no addition to their number should be permitted without the consent of the Secretary of State."

The Commissioners touch but slightly on the question of cruives. They state that the cruives, when legal, are held by such antient and special titles, and are so often sanctioned by statute, that it seems unfair to suppress them without granting compensation to their owners. They observe that an increase of the weekly close time to 42, or to 48 hours, with a stricter observance of the bye-law, would certainly render them less injurious to the upper proprietors.

With respect to hecks of mill lades, the Commissioners point out that the existing bye-laws do not afford sufficient protection to the young fish. The Commissioners recommend that it should be made law that the hecks at the intake lades of all mills and manufactories should be guarded by gratings, the bars of which not to be more than a quarter of an inch apart, or by a net work of the wire, the meshes not more than 1 inch measured round the mesh. These gratings, or small-sized hecks or wire net-work, they recommend, should be placed in position during the period of the spring when the smolts are descending the river. After that period they may be entirely removed, leaving the ordinary heck remaining. To this suggestion, we should think, there can be no objection.

The Commissioners notice the fact that in a good many rivers there exist natural obstructions to the ascent of salmon. They specify these in a large number of northern rivers. For example, they point out that, were the Falls of Tummel rendered accessible to salmon, either by the construction of a salmon ladder or otherwise, 100 miles of river and of lochs would be opened up for salmon. In the same way, were the Falls of Mounessie on the Spean blasted, about 40 miles of water would be frequented by salmon, of which at present none ascend. The Commissioners admit that even the removal of these natural obstructions would give rise to some difficult questions. For example, it might be doubtful to whom the salmon thus introduced into the new waters would belong. They even suggest that the property so created "might vest in the Crown, to be given off to any one to whom the Crown chose to grant it."

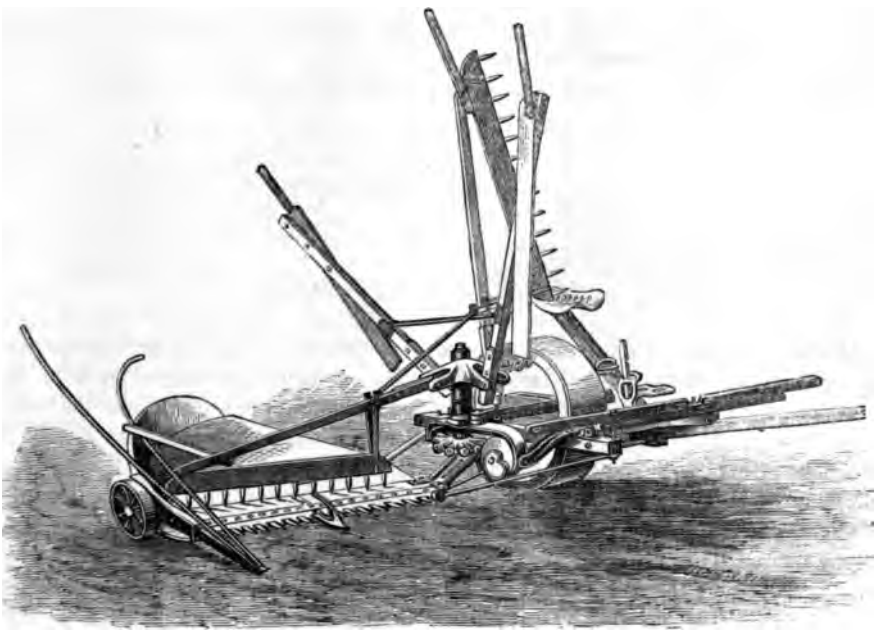
The Commissioners point out that a number of the salmon fishery districts are very small, and they suggest that power should be given to consolidate them. They further recommend that, to meet the case of the districts in which no Boards exist, inspectors should be appointed, as in England, who should exercise the powers of District Boards in those places where Boards do not exist.

They conclude thus: That the clauses relating to the pollution of rivers in the existing Acts require to be amended, and made more stringent and more capable of practicable application by District Boards; and that either of the two clauses given in the report, p. 30, are greatly preferable to the 13th section of the Act of 1862, as amended by the 16th section of the Act of 1868. That increased powers should be given for the protection of rivers, and that the county police should assist in prosecuting and punishing breaches of the Salmon Acts. That "parr" should be more distinctly protected than at present under the 19th section of the Act of 1868. That certain additions should be made to the offences specified in the 15th section of "The Salmon Fisheries (Scotland) Act, 1868;" and that there should be a fixed minimum as well as a maximum penalty for offences, the minimum to be one-fourth of the maximum. That a clause should be introduced to modify the over-fishing by net and coble practised on some of the larger Scotch rivers. That means might be adopted in many of the Scotch salmon rivers so to manage the storage and distribution of water as to counteract the prejudicial effects upon the fisheries of the improved system of land drainage.

Agricultural Engineering.

WOOD'S NEW CHAMPION SELF-DELIVERY REAPER.

A TRIAL of Mr Walter Wood's new self-acting reaper took place in the course of last month. This is the first time that a machine of the like construction has been seen in this country. We were particularly struck with the ingenious adaptation of the extra folding arms to the rakes, which thoroughly prevented any corn from being left upon the platform. The trial took place on the farm of Tolworth, near Surbiton, tenanted by a well-known agriculturist—Mr William Hipwell. The machine was first tried in a large field of very fine white Tartarian oats, considerably laid and twisted, averaging nearly 6 feet in height of straw, and calculated to yield 10 qrs. of grain per acre, and which was rendered very difficult to cut and deliver, owing to the heavy rain of the morning and subsequent showers. It, however, performed the work with perfect ease, and in a most efficient manner, and notwithstanding the weight of the crop, increased by the rain, the horses did not seem in the least overworked. The trial afterwards made in a field of wheat, was of a still more difficult character, as rain fell heavily for an hour before the start, thoroughly soaking the wheat and undergrowths; but even under these unfavourable circumstances, the work was done in such an admirable manner as to call forth the very highest encomiums from the onlookers, among whom were some of the leading agriculturists of the neighbourhood.



Wood's New Champion Self-Delivery Reaper.

This machine derives its motive power from a carrying wheel without spokes, with interval gearing, consisting only of two shafts, a like number of pinions, and a bevel wheel. This wheel is supported by side plates, and works on friction rollers. The arrangement of the rakes is very ingenious, these being driven from the main shaft without any intermediate wheels; the rakes are completely under the control of the driver, who sits on a comfortable seat on the side of the machine out of the way of the rake, and he can make the sheaf any size he chooses, by the simple application of his foot to a lever —at the same time by his weight balancing the machine, so as to avoid any undue pressure on any part, or upon the horses. Another advantage is, the knife, which acts in a direct line with the axis of the driving wheel, and however unequal the field, it cuts level, as it follows the inequalities of the ground along with the wheel, rising or falling as the case may be. The height of the cut, by a simple arrangement, is easily adjusted, almost in an instant. The machine is light, but at the same time strong, and a couple of horses, even in a heavy crop, as at Tolworth, work it with ease. The two-horse back-delivery reaper, possessing a similar motive power arrangement, was tried in the oat field, where it proved, under the most adverse circumstances, not only perfection in cutting-power, but also of easy draught. Mr Wood has, we think, in this new arrangement of his reapers, achieved an undoubtedly great success, and we look forward with much interest to the development of his invention.

From Scotland, favourable accounts reach us of the success attending the working of this machine on the farm of a well-known Scotch agriculturist, Mr Gray of Southfield, Duddingston, near Edinburgh.

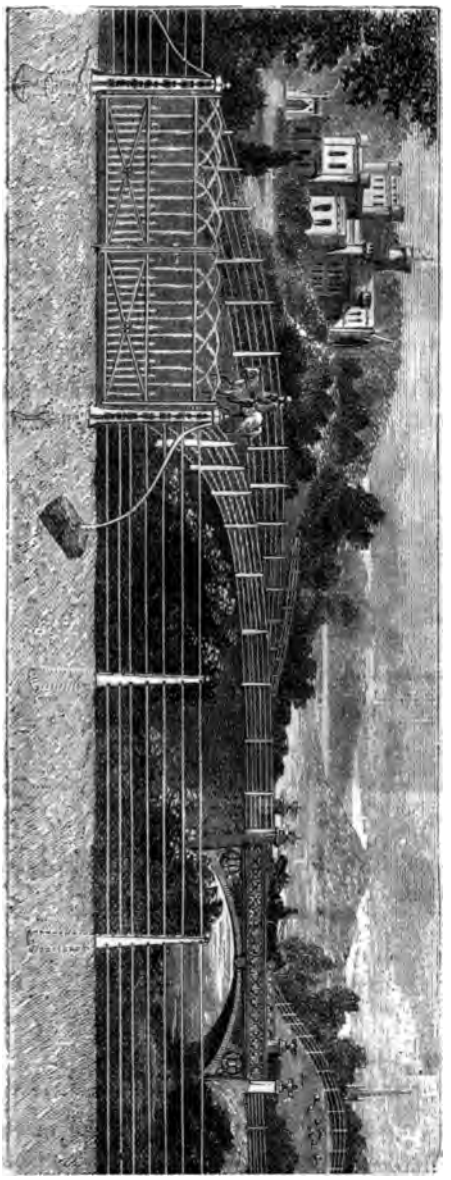
MORTON'S FENCING.

AMONG the more useful exhibitions at Wolverhampton in the Implement Department of the Show, was the one made by Messrs Francis Morton & Co. (Limited), of Naylor Street Iron Works, Liverpool, London, and Glasgow, of the different kinds of wire fencing and other articles manufactured by them. This firm, we believe, was the first to introduce the system of "Twisted Cable Fencing" (see fig. 1), which, since its introduction some years ago, has been repeatedly improved upon by them, and among the most important of these improvements is the mode of straining or permanently tightening the wires by the action of their "Patent Winding Straining Pillars" (see fig. 2), upon which the practical value of a fence depends.

We believe Messrs Morton were the first to introduce this method in a practical form, and their system is now very largely adopted for railway and agricultural purposes: it is also exclusively employed by H.M. War Department, and has been awarded the medals and highest commendations of the leading agricultural societies.

In connexion with wire fencing, this firm has also recently patented an intermediate iron fence post, made of wrought iron galvanized (see fig. 3), possessing an oval tubular form tapered, which gives it a light and elegant appearance. When fixed in the ground, it is perfectly rigid in every direction, an improvement never before secured—all the old forms of iron fence posts requiring to be keyed, tied, or wedged to the wires. The wires, in fact, supported the posts, instead of the posts carrying the wires, as they ought to do. The fence fitted with these galvanized oval posts (which is illustrated in fig. 1, and known as Morton's Fence, No. 5),

the firm supply largely for park and ornamental purposes, at a less price than common iron hurdles. This fence has lately been specially selected for the New Park in Liver-



pool; for the Southwark and Finsbury Parks in London; and may also be seen in the grounds of the Crystal Palace at Sydenham; on the esplanade at Brighton, Folkstone, Bray, and elsewhere.

Messrs Morton have also introduced an important "Patented Improvement in Continuous Bar Iron Fencing"—viz., their self-wedging or self-locking joints, which supersede the numerous expedients that have been contrived for securing the rigidity and practical usefulness of this class of iron fencing, such as loose wedges, pins, notches, staples, &c. This fencing requires no skilled labour in its erection, and is, therefore, efficient and cheap.

The Royal Agricultural Society of England has recognized the merits of their "Patent Iron Thatch," a substitute for covering hay

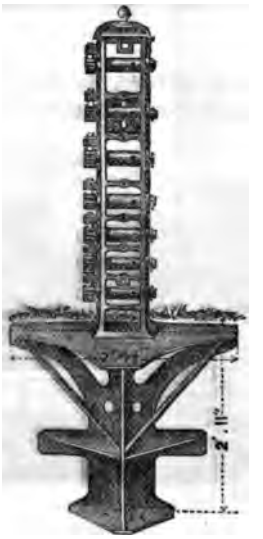


Fig. 2.—Front View.

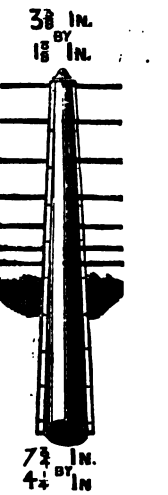


Fig. 3.

and corn ricks. This is perfectly secure against high winds, costs nothing for repairs, is weather and fire-proof, and is readily fixed by ordinary farm labourers.

Where a stationary stack covering is preferred, Messrs Morton meet the requirements with their "Permanent Self-supporting Iron Hay Barn Roofs," of which an example was also exhibited. These roofs (see fig. 4) are erected in single spans of from 15 feet to 45 feet, supported either on timber or on iron uprights. Entire farm-yards are frequently covered over by a series of such roofs (see fig. 5), for which purpose they are specially

adapted. Among other advantages may be named, the resistance they offer to fire. For this property they possess, the firm hold a valuable testimonial from the steward on one of the farms of the Right Hon. Earl Shrewsbury and Talbot, where these roofs are in use. It appears that a serious fire having occurred in a barn covered with one of them, the roof resisted the heat and flames until they could be extinguished, and thus doubtless, saved the homestead from destruction.

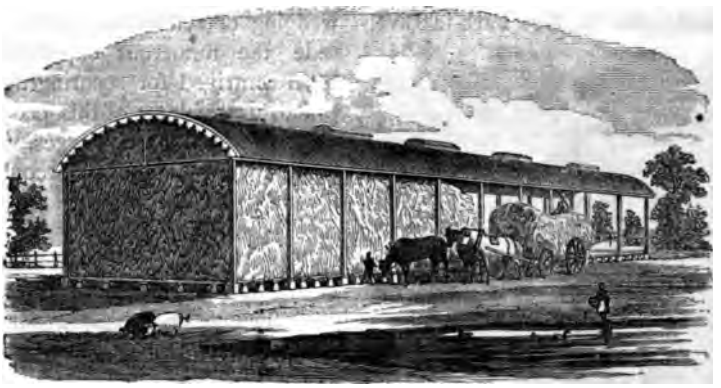


Fig. 4.

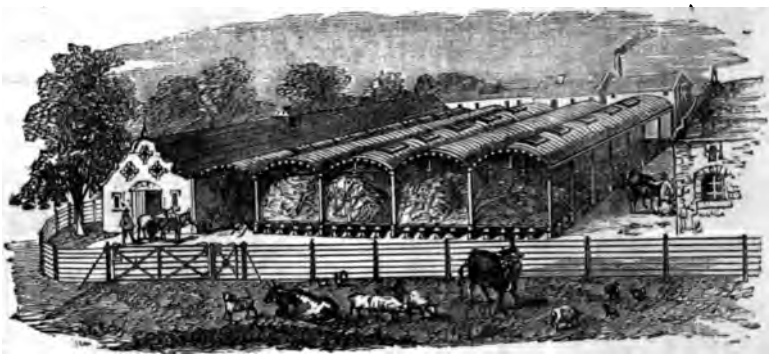


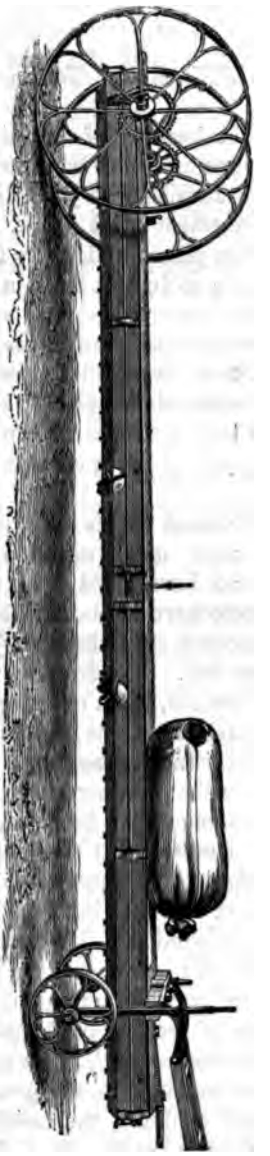
Fig. 5.

BROADCAST SOWING MACHINE.

A VERY excellent broadcast sowing machine has recently been introduced by Mr B. Reid & Co., of Aberdeen. It was exhibited at the Smithfield Club Cattle Show last year, where it attracted a good deal of attention. We have now the pleasure of illustrating it by two woodcuts—fig. 1 shewing the machine prepared for travelling by road; and fig. 2 the machine ready for work in the field. The machine claims several advantages over ordinary broadcast sowing machines. The seed-box is near the ground, and can consequently be safely used in windy weather; being in one piece and very strong, it cannot "flap" or "swing," as do the boxes of the machines

:re they are supported only in the centre, project over the frame on each side. :se machines are fitted with Sams's patent : seed dischargers, which are acknow-;ed to be superior to pinions, brushes

Fig. 1.



)s, or any other dischargers. The arrange-nt by which the machine is altered for d transit, is simple and very effective. e small wheels, as shewn in fig. 1, are :ed by a lever, when the end or carrying wheel is placed on the axle, the shafts also being removed from the same end, are easily attached to the centre of the machine, as also shewn in fig. 2. The machine has already gained a well-merited reputation, not only in this country, but also abroad, where a large number have already been sent. We may notice that this machine was awarded the first prize at the Baltic Agricultural Show, held at Riga three weeks since.

The Farm.

EXPERIENCES OF AN AMATEUR FARMER.

THIS is the heading of an article in a contemporary. It is written by a gentleman whose initials are "J. W.," and who, at the commencement of his article, declares that he has been placed under very fortunate circumstances, in so far that he is in a situation where he has "a constant supply of manure in quantity comparatively unlimited." He also says, that "it must be a poor farmer indeed, who cannot raise crops of all kinds successfully, and have a considerable margin to himself after paying all men 20s. in the pound."

What is the answer to this? It is simple. There are many men, within our own experience, who have failed who were not *bad* farmers, who have not been able to pay 20s. in the pound after sinking £5000 or £6000 in the soil. We do not give names just now, but we can, when called upon.

There are various reasons why a man fails in farming, who is not an *amateur*.

One reason is, that a farmer, not an amateur, might give too much for his land, to commence with; another, that the land, in the matter of drainage, might not be so good as he supposed it, and that in order to make it better he expended a large amount of money on it (we are speaking of places where there are leases); a third, that under the operation of the law of Hypothec, we refer especially to Scotland, although the law there has been modified to the great advantage of tenants' creditors, the landlords can at any time deprive the tenants of their farms without recouping them for the sums laid out. A fourth reason is, that farmers are not so well situated in the way of town-manure as the correspondent referred to. Staleybridge is the centre of a populous district, and manure there may be much cheaper than it can be purchased for in localities where people are sparser, and where there are more applicants for farms.

We give practical farmers the opportunity of judging of the amateur's experiences. He says:—

I have had this season 1200 tons of town dung, the most of which I have used for growing cabbages, mangolds, and turnips. So convinced am I of the good qualities of this kind of manure, that on 12 acres of green crop I have not given it the slightest assistance in the way of artificials. As a top-dressing for pastures it is unrivalled, and this for a two-fold reason:—First, in its excellent fertilizing properties; and, second in its being in such a state of comminution, it is brought into contact with the roots of the grasses whenever it gets a shower of rain, the good qualities of the manure coming thus into operation without the slightest delay. I have given up growing corn, finding roots and grasses to pay far the best. I have received over £7 per acre for the seeds on a field, the soil of which is naturally poor and open, the crop cut and carted off early in the season, long before the ryegrass was in flower, thus rendering the after-grass especially valuable. From the continuously high-feeding of the land, the grass becomes capable of being fed decidedly earlier every season, and this with climatic disadvantages of no small amount. This season I put my cows on excellent pasture on the 8th of April, a most unusual thing in this district, on which account I had many visitors, to judge for themselves whether the cattle really had anything to eat, few people about here ever thinking of doing anything in the way of improving their pastures. On 22 acres I have twenty cows and seven horses, and they have always plenty to eat. In addition to the grass, I give every cow 5 lb. of meal and cake. To vary the diet, I would be disposed to give a small feed of grains: but my cows have actually turned against this

of food, probably from continual high
g. I find rape-cake very difficult to be
good quality, and, in consequence, linseed,
gh dearer by the ton, becomes actually
caper of the two in the end, as there is
ıste and no accident following its use.
ɔr rape-cake is of a very heating quality,
ng swelled legs and other injurious con-
ıces in the cattle partaking of it. I had
ɜ than five cows at one time so lame as to
rcely able to go out and in, bad rape-cake
undoubtedly the cause of the injury, as
ɛcovered immediately on the cake being
ɹawn.

stock of dairy-cows is at present twenty,
ınited produce amounting to 240 quarts
For high feeding, I find cows on their
calf to suit much the best, the profit
considerably over that made by younger
and this for several reasons. They
rst of all, just in their prime for milk,
give a large flow for a very long
when the food is succulent, rich,
ınundant. Second reason, they finish off
butcher to much greater weights than
ɛr cows, and yet are not past the age when
ce per cwt. would be lessened on account
rioration of quality. It is astonishing how
cow will continue to milk profitably if
d and not permitted to get in calf. I have
which I purchased twelve months ago for
nd her daily produce, measured by itself, is
er the average of the whole. My experi-
cow-keeping is, that where there is a ready
for the milk at a high price, it does not
take the slightest trouble in rearing young
purchasing heavy cows in their prime,
ɛr high the figure, being far the most
ble, and, moreover, one's labours
ergies are concentrated on one object—
at help to success in any business.
remark, further, however, that these will
ıke much money, either if their feeding is
d or in any way curtailed; they must be
ɔnstantly full, and the appetite even
d by a change of food. The constant
ɛeding thickens the flesh so much that
mals change completely in character and
ance, eventually becoming so weighty
ey bring up to £10 more when parted with
ıey cost when brought in. This goes a
ay in helping the profit of cow-keeping,
a considerable part, if not at times actually
ole of the purchased food. In no case is
on the first cost admissible, unless it
accidentally, as such management could
scarcely fail of turning out a very bad business
indeed. The manure made by highly-fed cattle
is a point in aiding success; which should on no
account be overlooked, as by its aid immense
crops of roots and cabbages can be grown, and
that, too, on very poor land naturally. On this
account the bedding should not be stinted, as
however good in quality the droppings of the
cattle may be, some bulk is required when
applied to the land, and even if straw has to be
purchased, its value is so great when soaked
with rich urine, as to far more than counter-
balance the expense of procuring it.

With regard to the growth of cabbages on
a portion of the green crop break, much depends
on the facility for procuring manure, as unless it
is given with no sparing hand, those going ex-
tensively into it for the first time may experience
considerable disappointment in the result. This
plant is a very gross feeder, filling the soil with
a mass of fibres, and growing with extraordi-
nary vigour when the land is well worked and
filled with manure. Unless, therefore, these con-
ditions are fulfilled to the very letter, it is
better to put in some other crop. I do not
think the value of the cabbage as a field-plant is
at present appreciated as it ought to be in this
country, but still believe its cultivation is ex-
tending, and that the time is not far distant
when agriculturists of every grade will acknow-
ledge its value, and make its cultivation a source
of profit. When liberally treated, there is no
other plant that I am aware of, capable of giving
such a large monetary return, and if used on the
farm, such a large amount of food for stock.
Few people like to name the sum this vegetable
is capable of making when sold in open market
—the amount looks so improbable by com-
parison; yet the fact remains, that it is simply
enormous. A neighbour of mine put in 20,000
plants to the acre, and sold them this spring
and early summer at 1s. 6d. to 2s. per dozen in
the Manchester market. Assuming a very
large margin to be deficient of the original
number when brought to market, through de-
fective planting, ravages of slugs, or severity of
the weather, there surely ought still to be suf-
ficient left to make over £100 in cash, even if
the lowest price be taken as the average. The
number named may appear large, but setting
them out in rows 2 feet apart, and 1 foot distance
in the rows, takes about 21,000, and for early
cabbages there is no necessity for having them
wider. With the large Drumheads it is, how-
ever, quite different; they must have room,
from 26 to 28 inches being a useful distance

each way, admitting the drill-grubber both lengthways and across, and giving them a chance of attaining a large size. Encouraged by last season's success, I have planted 9 acres with cabbages, putting in 80,000 plants, or about 9000 to the statute acre, as nearly as could be managed, which gives ample room for cultivation. In planting them, I feel no desire to get over the ground in a hurry, preferring to take a little time and secure as regular a plant as possible. The spade is a very safe implement, making a slit, inserting the plant, and finishing off with pressure of the foot. When the land is moderately free from stones, and in moist condition, the operation can be very successfully performed with the setting-pin, a smart and careful man accustomed to the work doing them both speedily and well. The great plenty of valuable food which is obtainable from a few acres of cabbages, must be seen to be properly understood or even believed, all the domestic animals, not excepting the horse, eating them with the greatest avidity, either in a raw or boiled state, and thriving proportionately. For the feeding of sheep and dairy stock, they are especially applicable, the butter made in the depth of winter, when this food is very largely used, being sweet and good, and quite free from the prevailing unpleasant taste which makes turnip butter almost worthless.

NO MORE GUANO.

WE copy the following article, by Mr D. T. Fish, from our contemporary, the *Gardener's Chronicle and Agricultural Gazette*:—

This means dearer bread, scarcer meat, more paupers, heavier rates, higher rents, smaller profits; bad times for farmers, short time for labourers, and more hungry and half-fed throughout the kingdom. It may mean more and worse than all this—semi-starvation to many, pinching poverty to more, more suffering and privation to all; embarrassing problems in politics, social strife, danger to order, and serious peril to our institutions. For, humiliating as the admission is, it is nevertheless largely true, that the security, happiness, stability of states, rest largely on the state of their larders. Fill them with an abundance of good things, and nations wax fat and prosper, while ill-filled stomachs are the natural allies of treason, confiscation, sedition. No monster so unreasonable as gaunt famine, gnawing hunger, and these seem barking at our heels in the no very distant future. Every day swells the ranks of the bread eaters by the thousand, while the area of production, we are told, has reached its limits, and one of the most powerful promoters of fertility is exhausted. Truly the prospect seems most gloomy. It would be intolerable but for some gleams of light athwart the gathering darkness. We are not wholly dependent for life on home supplies of food. Corn comes to us from every land. Science has well nigh succeeded in bringing us fresh beef from the antipodes. We have been called a nation of shopkeepers—the cotton-spinners for the human family. We should be more truly described as a nation of bread and beef eaters. Our shambles and bakers' shops cover the earth, and our deliveries, in transit, block up the sea. Every breeze wafts us golden grain or preserved meats. The prairie and pampas alike are but wide fields on our outlying off-hand farms. But it must never be forgotten that as the food from distant lands rolls in, the gold is drained out. We are fed, it is true, but we are likewise impoverished. Foreign food blesses us but once—home supplies many times. And it would be easy to shew that food is to a large extent cheap or dear—and that means to the mass of consumers plenty or scarce—in proportion to the amount and quality grown at home. The more bread, beef, sugar, grown in England, the cheaper these commodities; the less, the dearer—free trade and its invulnerable theory of exchanges notwithstanding.

Accepting your estimate, we have reached the maximum of home production; with all

the land occupied, and one of our most powerful stimulants exhausted, we can hardly expect to get more out of the land. Hallam's *dictum* seems also irrefragable. "There are but two possible modes by which the produce of the earth can be increased; one by rendering fresh land serviceable, the other by improving the fertility of that already cultivated." You assume that the first mode has been worked out. No more commons to enclose, no fresh land to be possessed! Of course the statement is meant to be wide and general. There are still many exceptions to it, a good number of acres throughout the kingdom that might be profitably reclaimed. How frequently we pass over barren tracks, only separated from splendid fields of corn or roots by a fence! Surely, if the one could not be made as fruitful as the other, then our geological boundaries are more sharp and capricious than we are wont to believe. They are likewise wonderfully easily obliterated, for I have never seen an unsuccessful attempt made to make the one land as good as the other. But it is not of such means of getting more land that I am writing at present, for these wastes cannot be had for nothing; on the contrary, they rise wonderfully in value as soon as wanted; but my light and hope for the future is—more land without more rent. Surely in these days of struggling competition for land, when a raid is made by eager farmers on every vacant holding, that cry will be listened to. No new land laws are needed to make that land yours. How, then, are you to get it? Get your smashers and ploughs deeper, and it is yours. Amid all the barbarous impediments to improved cultivation stereotyped in antient lease, I have never read among them, "Thou shalt not go down and find new gold fields,"—that is, fresh land beneath each furrow. There it is, in every arable field throughout the three kingdoms, waiting patiently through the long ages to be possessed by the well-fed roots of the future. No fresh land to be possessed—only every inch gained in depth adds 120 additional tons of productive force per acre to your fields. Let us pause a moment, and try to realize the meaning of this statement A 4-inch tilth represents a productive earth force of 480 tons, a 5-inch of 600 tons, a 10-inch of 1200 tons. I do not assert absolutely that a 12-inch tilth would yield three times more than a 4-inch, but I do affirm that the capacity of the deep tilth would be three times that of the shallow, and were they both alike rich and good in texture, the possibility is that the 12-inch would yield even more, especially of root crops, than the legitimate ratio of three to one.

It may be well also to remind your readers that these views are not founded upon mere arithmetical data, nor natural philosophy formula—thus, two and two are four, the energy of mass is apportioned to its size—but that they have been abundantly proved in practice by many years of actual experience. It is amusing to read occasionally, in the discussions at farmers' clubs, of namby-pamby farming as mere gardening, as if the practice of horticulturists was in a laggard, benighted, to-be-commiserated state. So, evidently, does not think that busy, great, and intelligent farmer, Mr Mechi. In his most suggestive letter on "Liebig's Theory Vindicated," he points out how gardeners have long been familiar with the art of feeding the lower roots, and implores farmers to go and do likewise. And where are those lower roots to be found? On the farm, from 4 to 6 inches from the surface; in the garden, from 2 to .4 feet. Rather namby-pamby cultivation that, is it not? The wisdom and advantages of this radical treatment of the earth, this cultivation of the lower farm, is proved by the irresistible logic of such facts as these—the increased produce and superiority of garden crops, and the higher rent of garden land. Similar good results are reaped from deeply-cultivated farm lands.

It will probably be another century at least before a maximum depth of tilth will be generally reached. Until that time—if come it ever will—there is plenty of fresh land to be utilized. It is wholly a mistake to measure the productive force of the earth by square feet or yards. This mode of computation has

led to intense competition for possession of surface only. The joint streams of capital, skill, and labour have spread wide—not run deep. The consequence has been a tremendous loss of productive force, and a wretched average return at about £4 per acre. By doubling the depth you get as much again land for the same rent; and surely it is almost as obvious as that two and two make four, that with as much again food, the things fed thereby—that is, the produce—ought also to be doubled. Some will doubtless cry, "I have tried it frequently; you cannot do any more than cover the surface. My crops cover the ground." Yes, but with what sort of covering? Might not these ears be longer, each kernel larger, heavier?—each beet, turnip, and mangold reach double the size? I do not affirm too much when I say, you know they might. And for the development of quality and weight, the unused earth at the bottom of the furrows is as good, nay, it may be better—at least it may be made so—than that on the surface.

But this brings me to my last point. How are you to get more out of your enlarged holdings? All your manure was too little to enrich your shallow tilths; how is enough to be provided to satisfy the deeper ones, especially as your old friend, guano, is worn out? These are vital questions, and I will endeavour to answer them briefly and fairly. The earth itself is a productive force of no mean value. This is too apt to be overlooked by the farmer; he treats the ground too much as he would a horse—so much corn in, so much work out; so much manure in, so many coombs or tons out.

But the earth can also produce somewhat without manure, and this natural force can be wonderfully augmented by aeration and admixture. This co-mingling of earths in the soil is somewhat analogous to the cross-breeding of animals. The product of the admixture of soils is a wonderful increase of growing force. Even the addition of a comparatively worthless earth to a good soil gives, as it were, a fresh lease or a new infusion of growing power to the entire mass. That great and good teacher, Mr Mechi, adverts to this in the letter already referred to, and I think a useful aid to deep culture might be rendered by republishing, in a cheap form, Mr Smith's, of Lois Weedon, and Mr Lawes' experiments on what might be called the normal productive force of the earth without manure. Again, deep tilths utilize to much more advantage all the manure applied to them. On shallow tilths it is no exaggeration to affirm that one-third of the manure is utterly wasted; it is either lifted up into the air or washed out into the water; it is not half covered, and its strength is rinsed out into the nearest ditch or blown out by the first breeze; but deep tilths hold manure tenaciously as a blacksmith's vice—the top covering is thick enough to be gas-proof, the bottom is deep and retentive of manurial juices as a sponge. There is, there can be, no loss.

But then, with a dearth of guano and more land, will not the farmer be in a worse dilemma than before? It certainly seems so at first sight, but we fall back on the common proverb, that when one door shuts another opens. We believe this will be verified in this instance to the letter, and that, moreover, the second door will prove by far the best for the farmer. While the guano store lasted, it seemed useless to direct attention to other sources of enrichment, but close that door and our home guano will stand a chance of being fairly tried. Here, again, I am glad to find the views I have endeavoured to promulgate for years are in perfect accord with your own and Mr Mechi's. Both reach the same point from opposite sides; the guano deposits are exhausted, therefore recoup your fields from the refuse of your consuming centres, is your cry; deepen your tilths 30 inches, and flood and enrich them with town sewage, re-echoes Mr Mechi. I reiterate these cries. Possibly, they may be heard now there seems no other means of getting more off the land than by recouping its productive force by the waste of our lives and the dirt of our labour. We are coming to this at last, by a process of exhaustion. All other means have been

to enrich the earth. Battlefields have rifled of their bare bones, islands in the ıt ocean have been scoured for birds' ; seeds, oils, and entire crops converted feeding cake, and giving food for the y earth; and still the latter remains y, and cries out with a louder voice and a deeper throat every year by year, e, give."

: take more out of it, and must give it , or break its back by exhaustion. The ened earth revenges itself on us for our rdly feeding by light yields; for in the r of culture and manure it is emphatitrue, as we sow so we shall reap. All hile we have been starving the hungry of its proper food. We have been ng it most lavishly in all directions, and the proper food of the earth, has literally sent a-begging. We begged the wind and r to take it, and they reproved our folly turning it in fiery fevers or the serpent of lingering disease. We poured it into vaters and they became black in the face rage, and the pure water of life was trans-d into the slimy draught of death to ands. We offered it to the fire-god, ıe licked it up in anger, and reproved wasteful folly by scattering its elements icast throughout the air we breathe.

hile all this folly, waste, and wickedness it was all three—went on, the mute, suffering, ill-used earth looked on, and ly wondered at the so-called wisdom of ıasters. At last the cry arose, to the with all excrements and waste, the filth wns, and the dirt of the country. And arth heard it and rejoiced, and thought its time—the time when it should be with marrow and fatness—had at last . Vain hope—fond delusion. Ignoprejudice, habit, old saws and modern instances, even Mammon with his moneybags, blocked up the way—stood an impregnable barricade between the hungry earth and its natural supplies of food; and the year 1871 finds us wasting manure at the rate probably of £50,000,000 sterling per annum, to the impoverishment of the earth, and the wasting of the very essence alike of vegetable and animal life; for it can never be too often repeated that the food of plants misapplied, wasted, unused, is disease, suffering, death to man; and all this while the wisdom of Parliament is expended upon the ways and means of raising £3,000,000 more revenue, and the struggling taxpayers are crying out that 2d. more Income-tax will break their backs. No wonder there is all this impatience of taxation, all this anxiety to play pitch-and-toss with local and imperial burdens, while we are undermining the energy of the earth itself, the foundation of all our riches, by our wasteful extravagance of our home-made manures. The Chancellor of the Exchequer has just tried to raise a small tax from our matches and tapers; I wish he would try to lay a large one on the waste of good manure. Such a tax, fairly levied and sternly collected, would set all future Chancellors' minds at rest about ways and means for this generation, while it would enrich posterity so much that they would pay all demanded of them without grumbling. Certain it is that only by doubling or trebling the depth of our tilths, and by enriching them by all our waste, can the circle of production be completed, and the strength of the earth, represented by our harvests, restored. The nation that wastes not manure shall not want bread, but there need not be the slightest hesitation in affirming that the very opposite is equally true.

GREEN FOOD AND THICK SOWING.

By Mr J. J. MECHI.

THE longer I farm the more I am convinced that the turning-out and roaming-at-large system will come to an end, especially as land gets scarcer and dearer. It is cheaper and better to bring the food to the animal than the animal to the food; because in the latter case he is permitted to trample upon it, excrete upon it, and lie upon it. One of the largest and most successful farmers that I know has always folded his sheep and cut the grass for them—one man, a lad, and a horse chaff-cutter being on the field, there feeding the sheep with green grass chaff, mixed with cake, &c. Although seventy-seven he is, and always has been, among the very best root-and-corn growers among my acquaintance, on an area of 1500 acres. Green tares, clover, &c., are all passed through the chaff-cutter for my horses and cattle, the corn ground and roots pulped. One trial will prove the fact, and put money into the pockets of my agricultural friends. Our sheep and lambs are close folded, and have no more food than they clear off. Fold moved twice a-day—one 15-feet iron hurdle on wheels to every five sheep. Lambs have the first bite, and are followed by the ewes to clear it all up. Our green food (tares, clover, or Italian ryegrass), after passing through the chaff-cutter, is spread thinly over an asphalted floor in the cool barn to prevent heating.—We must enlarge our stackyards, or so separate our stacks as to leave room for working the corn and hay elevators, worked by a pony—for in one case near me the farmer who bought one of these finds it almost useless to him because his stacks are placed close to each other in the stackyard; the pasture makes a good stackyard as far as room is concerned. The horse-work elevators that carry up the sheaves or hay, and drop them in the centre or any other part of the stack, save the labour of quite three men, which is very important at hay time or harvest.

Machinery grows upon us year after year, therefore our landowners will have to increase the machinery sheds, charging a fair per-centage on their cost.—Is not mildew often caused by too thick sowing and early laid crops? I believe that this is one of the true causes. See what takes place. The densely packed mass of plants, weak below, tumbles down flat or twisted in various directions by winds and thunderstorms, and thatches the earth; so that, while rain can pass through the thatch, the wet earth is shaded from the action of the sun and air, and becomes in the like condition to a dark and damp cellar, where, we all know, mildew and Fungi flourish. I have a dark corner in a portion of my house here, where my boots and shoes always mildew, if left long unexposed to light. When crops stand erect, as nearly all mine do this year, and generally, there is free circulation of air and light, and a free evaporation of moisture from the earth. Therefore, although from the intensely green luxuriance of the corn crops, mildew is often predicted by my visitors, it never comes. Of course, the drainage of land has a good deal to do with this, and so has the absence of trees and fences; but wherever there is a dense closing in of the moist earth, either by too dense, flaggy, vertical, or laid crops, there we have risk of mildew, especially on rich boggy lands, that force a great or rank development of flag. Some very good farmers remove the flag from their cereals. My wheat crops from a bushel per acre, drilled, are all I can desire, and even the 2 pecks per acre are undistinguishable from the rest of the field. Barley 6 pecks, and oats 2 bushels, are enough for me.

PEEWITS AND THE TURNIP CROP.

MR RALPH CARR ELLISON, in an article to our contemporary, the *Field*, points out the services which these beautiful birds render to the turnip crops:—

The green plover is well-known on account of its delicious eggs, which are taken in great numbers every spring, and sold as an article of luxury. The species is so prolific that it would bear this extensive deprivation of the eggs, if the latter layings were spared, and, above all, if the parent birds themselves were better protected against idle and heartless gunners during the season of reproduction. In very early spring every year these birds return to their breeding haunts with the first mild and sunny weather about the middle of March; they are often driven away again by severe weather, and compelled to seek food along the sea-shores, till near the end of March; but then begin in good earnest their beautiful and graceful aerial tumbling, whilst the males vie with each other in agility, and in the vigorous repetition of the peculiar nuptial strophe into which their cry is then modulated. At the same season there is developed upon the pinion or wrist-joint of each wing of these males, a hard bony wart or excrescence. This represents a truly formidable spur, which is formed on the same joint, in certain tropical or sub-tropical species of the same genus, Vanellus; with this the bearers enforce respect even upon the buzzards, kites, vultures, and eagles, as they dash at them in the region they inhabit, when those plunderers approach the nesting of these sub-tropical species. In like manner, the hard, angular, and warty wing-joint, or wrist, of the peewit (which is known perhaps to the corbies and other depredators, as the former tilts at them, bringing his wing close to their heads with the whizz of a rocket), compels the birds of prey to watch the assailant, and deters them from scanning the ground for eggs. In this way the plovers are valuable allies to the gamekeeper, for not a crow or magpie will they let tarry in their field or its vicinity. By moonlight they are no less active, vigilant, and clamorous. They are ever on the look-out for reynard, whom they will mob and follow to his no small hindrance, in his midnight prowlings, under a clear moon. It is said that he has a way of snatching one out of the air now and then, by a very sudden spring and snap, after having long hung his head as if half asleep. This, it is reported, has been seen to occur even by daylight on the moors, and it is in nowise incredible. Great numbers of eggs are destroyed in the border counties by the farmers' rollers; yet, despite of all this, the "tewffits," as they are called, are in great plenty. And happy for the turnip-crop that they are so! For no sooner are the young able to fly, than, in company with the old birds (then moulting), they congregate into flocks, and about the beginning or middle of July they all betake themselves to the turnip fields. Here the plants have been thinned out by hoe, and are becoming hopeful and conspicuous to the owner's eye. But, alas! this invaluable provision for cattle and sheep during winter is subject to the attacks of various grubs, the ill-starred progeny of as many different kinds of beetle, or other creeping or flying things. Whole acres of the most promising turnips, already half-covering the mellow ground, so rich with manure, and clean from dilligent tillage, will be seen suddenly to flag, as if the tap-root of every plant had been divided underground by a knife. This is the doing of one kind of grub, which penetrates the fleshy root, and, after half-destroying it, makes it take the form of "fingers-and-toes," and the crop is all but lost. Many insectivorous birds are, at this season of July, active among young turnips, when already almost half-grown as respects the foliage. Thrushes and blackbirds leave our gardens and shrub-

beries, and resort to this rich feeding-ground for grubs, worms, and insects. But the peewits come in hosts, where their species is not persecuted, and richly do they repay the farmer for his forbearance towards them whilst tending their eggs and helpless young. It is at night that the grubs leave their hidden tracks in the soil and come out above ground. The rooks, thrushes, larks, pipits, &c., are gone into roost; but the plover tribe feed as much by night as in the day-time; they are especially active in late twilight, and in the earliest that precedes the dawn, thus suprising the nocturnal insects that escape other birds. And he who walks in the fields at midnight in summer, when the moon is up, will hear the congregated plovers holding animated conversation in every breadth of turnip land, where they are enjoying both peace and plenty. How admirably is the bird's large, full, orbicular black eye constructed for feeding while the sun is far under the horizon, and the light extremely feeble! Whilst visiting the Orkneys in July, a few years ago, I was much struck by finding no green plovers present on the cultivated fields, nor any, indeed, elsewhere to be seen. But their place was efficiently supplied in the fields of thriving turnips by the beautiful little ring-dottrels, which I saw running along the drills between the plants (many in every field), and uttering their softly wild whistle of anxiety for their young. It was evident they had led these with them from the adjoining lands, or from the shores, to the plenteous grub-food to be met with on the manured turnip lands. Dottrels, again, are true nocturnal feeders, and no less efficacious than the green plovers against wireworm and countless other pernicious insects. What seems to be needed for the good of agriculture, is a close time for green plovers or peewits from the 1st of March to the 1st of September.

STORING OF TURNIPS.

FOR many years we have called attention to the fact, that the storing of turnips is one part of the farmer's laborious duties which is very sadly neglected, in Scotland more particularly. It is sad to see how many valuable roots have been sacrificed for the want of a little foresight—through the desire to get the uttermost ounce added to the weight of the bulbs, or through too implicit reliance, at the end of the year, on that very capricious personage "the Clerk of the Weather." Farmers, as a rule, have failed to take advice from our own columns, and those of contemporary newspapers and magazines; and the bitter regret they express at their want of prudence, when the evil day comes upon them, brings with it no amendment for the future.

"Knowledge comes, but wisdom lingers."

The sad experience of one year does not bring, as it ought to do, sagacity in the following. The same old lack of care, and reprehensible credulous "trust in Providence," characterize the husbandman in this particular matter, season after season.

We trust it will not be ever thus, that farmers will yet come to indulge in prudence more than in procrastination; and they will find the former course by far the most profitable, with reference to the turnip crop especially.

Holding the views that we do, we recommend to our readers the following abridgment of an excellent article which appeared in the *Scotsman*, on the storing of the turnip crop:—

There is probably no branch of farm management that has been more generally neglected for a considerable number of years than the securing of this crop from the ravages of winter. From the Government statistics for 1870, it

appeared there were in that year 498,932 acres under turnips in Scotland, which is nearly one-ninth of the total cultivated area of 4,450,544 acres; while the proportion of green crop to the arable acreage was rather over one-sixth. It is not necessary to adduce statistics to shew that turnips are the most expensive crop the ordinary Scotch farmer grows. In return, they prove an all but indispensable article of animal food, and afford great facilities for cleaning the soil periodically. In favourable seasons, many fields of yellow turnips in various districts of Scotland, notably the north-eastern counties, weigh 30 tons an acre. From 20 to 25 tons per acre is a common weight in suitable seasons, both for swedes and yellows, but about 18 tons is about the average crop. It is absolutely necessary, however, that the enterprise and attention which the farmers thus display should not cease when the turnips arrive at maturity. It is not so with other crops. When the grain crops are ripe they are secured from the iron grasp of winter as rapidly as possible, and the same is true with regard to the potato crop. It is true, grain and potatoes are rather more liable to injury by frost, snow, rain, &c., than turnips; but if the experience of the last two winters do not convince most farmers that turnips are liable to suffer severe damage by exposure to the elements in winter, it would be an all but hopeless task to convince them in any other way. The winter of 1869-70 inflicted heavy losses on the turnip fields. The frost came on early—before even a supply of turnips to meet an emergency could be secured on every farm—and continued till March, with such severity that, from the absence of snow on the ground, more than one-half of the root crop all over Scotland as it stood at the middle of February was rendered entirely useless. It is within the mark to estimate the area covered by turnips at the middle of February, at fully one-third the acreage under roots during the year. This gives 170,000 acres outstanding in February. Calculating the original value of the turnips at an average of £9 per acre, which is a very moderate estimate, and the loss by frost at a full half, there would have been an actual loss from frost and vermin of about £800,000. These figures proceed on the assumption that the crop was at its full value up to the middle of February. Such was not the case, however. The quality of the bulbs was considerably deteriorated more than a month before that date. Making a reasonable allowance for the early destruction, the total loss on turnips in Scotland from the effects of frost and vermin (frost particularly) in 1869-70, could not have been less than £1,000,000. Last winter, again, matters were little, if any, better. Farmers had more time in the end of the season to store turnips, but, from various causes, the proportion secured was infinitesimally small. Frost appeared early in December, and bound the soil till nearly the middle of February. In some districts, there was a thin coating of snow on the ground during the period of the most intense frost, and this saved the bulbs a little. The loss this year was in some counties even heavier than last. Altogether, it is not too much to say that nearly another million pounds have been lost by the effects of frost on turnips this year. There can be no doubt farmers must suffer in the first place from such losses, and the nation in the second.

But we have not pointed out all the ways by which loss is occasioned by having turnips exposed during winter. When the frost extends week after week—nay, month after month, as it did in the last two seasons—there is by-and-by no alternative but to dig with a pick or mattock, from the frost-bound earth, bulbs frozen frequently to the heart. This is very undesirable work, but it is often, in such cases necessary, in order to supply the daily rations; and the extent to which turnips have hitherto been stored on the majority of farms is rarely sufficient to meet the requirements of a couple of months or so. Dug in such a way, a-third of the turnips is left in the ground, unless great care is exercised; and even with the utmost caution the quantity is diminished, independent of the deterioration in quality, which makes them at this time almost worthless as an article of food. Cattle will not feed on frozen turnips, and for cows in-calf this is a very dangerous diet. Food in this condition often causes abortion in cows, which many stock-owners know from costly experience is a very serious affair.

The farmer should see it to be not only his interest, but his duty, to store his turnips just as perseveringly as he does his other crops. Turnips being later than cereals in reaching maturity, there is, of course, little time often between the end of harvest and the severe winter weather to secure this root. They continue to grow late in the season if the weather is mild, and it is deemed imprudent to store them until they are at full maturity; but, as a rule, much more might be done in storing. How this work can best be accomplished, however, is a problem which has scarcely been satisfactorily

solved. What has been done hitherto has been performed in various ways, and a still greater variety of modes have been spoken of. The good old system of drawing as many as possible with the hand, and heading and tailing the bulbs into rows, is probably the best yet adopted. But great care should be taken not to bleed the bulb, for turnips bled at either end, especially the top, will not keep long. The tails should be simply pruned, and not cut off close by the "neep," nor should the tops be cut off close to the other end. It is not desirable to leave much of the tops (probably not more than three-quarters of an inch from the bulb), and no stray blades or tops should be stored among the roots. When any part of the blade is deposited with the turnips, it soon rots, and is apt to contaminate the bulbs around it. The bleeding, however, is more objectionable.

What cannot be uprooted in the way indicated should be furrowed over by a plough. It is very desirable to have this done before the turnips are exposed to much frost. If an average furrow were turned on the roots in the ground, frost of an ordinary degree of intensity would not injure them; but even with a furrow of considerable depth, they would not be completely defended from frost such as we had in the last two winters. Its ravages, however, would be immaterial. Though the drill plough cannot be said to afford absolute security in severe weather, a small portion of the turnip crop, especially swedes, should be left in the root, and furrowed up for spring use; but the greater portion should be drawn as early as possible.

As to the storing of the turnips after they are topped and tailed, it is impossible to recommend any mode which would be alike suitable to all farms. If the soil on which they grew was dry, a considerable quantity could be "pitted" on it, and driven to the farm-steading in frosty weather. With small quantities in each heap, the difficulty of securing a sufficient quantity of air is almost overcome. Large accumulations, however seasonably covered, must be provided with ventilators. The covering of turnips in a wet state should be avoided, unless they are to be used very early; otherwise they would not remain wholesome in the pit. It is not desirable to have them pulled wet, but it is worse to cover them in such a condition. When the weather is ordinarily dry, pitting should follow closely the "topping," and if this is done properly with small pits, and not less than 8 inches of soil put on the turnips, they will be good for feeding purposes several months afterwards. Not a little of the depreciation in quality, often complained of in turnips that have been long in pits, is attributable to some mismanagement in storing. It sometimes happens that farmers, chiefly to avoid breaks in the work, keep their *employes* topping and tailing until several acres are ready for gathering, and then, perhaps, devote a day to gathering and covering. This might be a commendable system were it in summer, when the weather can be more safely relied on; but as it is at a very different season, it is to be deprecated. One night of severe frost would spoil the turnips somewhat, if not for immediate use, at least for keeping, and heavy rain for several days would have a similar effect.

But there is no way in which they can be better stored than under a roof. Brought from the field in good, dry condition, a large quantity can be well stored under a wonderfully limited roof, provided always the house is properly ventilated, as the majority of houses devoted to this purpose are. More accommodation of this kind should be provided at almost every farm, and the present generation is likely to see great additions to the turnip shed department at many farm-steadings.

When there are no immediate prospects of farmers being enabled to "head" and "tail" a large breadth in a seasonable state, either from bad weather or want of a sufficient number of labourers, we would recommend, as an alternative, covering three or five drills' growth in together with the plough. This can be, and sometimes is, performed, by turning a furrow with a single-boarded plough, away from each side of one drill. The turnips of one drill on each side, and sometimes two on each side, are then hauled by the hand and thrown into the newly-excavated furrows, "heads," "tails," and all, and afterwards covered by a few furrows. This has been found by some to be a more satisfactory process than running the drill-plough through the drills without uprooting any of the turnips, but, of course, it involves more labour. It is a more speedy system than topping and tailing, and it has another advantage —namely, that it can be accomplished without any serious consequences when the turnips are too wet for storing otherwise.

WHAT IS THE CAUSE OF POTATO DISEASE?

A D.," a correspondent of the *Daily News*, writing from Bedfont, com- its thus upon the cause of the potato ease, and how to cope with it:—Were not a subject of general and important in- st, your remarks upon the appearance of potato disease in Ireland at the present e would be a sufficient excuse for my ing a few words to say about it. Un- unately for us here, the disease is not con- d to Ireland, but exists among our own ato growths in greater or less degree, just peration as predisposing causes operate avour of its propagation or otherwise. The character of the disease still remains in curity. We have too visible evidence of working, but know little or nothing of its and wherefore. Natural physiologists n to have been entirely beaten in their eavours to discover its source and cause, especially to tell us why, of all vegetable ducts, the potato should be the only va- y upon which the disease operates anything like deadly influences. We w that an atmosphere highly charged moisture is the primary agent that ributes the disease, but even then the ease is not existent in all rains, but in only ain forms of it. A real heavy downpour s little mischief apparently, except as in ar it assists to induce a coarse succulent wth in the haulm—a most unfortunate lt. The rain to which we attribute the chief is of the white misty order, which erally accompanies an atmosphere either ly charged with electricity, or else with ain infectious zoospores that carry disease death to the lungs of the potato, namely, foliage, as surely as does the exhalations the small-pox patient to others of the an family. The operation of the ease, as shewn in the haulm of the potato, s not favour the theory that it arises from tricity. I believe that I am right in stating that when electricity affects vegetable life, it produces an almost instantaneous death of the part affected. Close observations shew that the disease invariably appears first in the form of a brown blotch upon the leaf, the underside of the blotch shewing a whitish mildew. Whether this mildew is the disease itself in operation, or whether it is the result of decomposed vegetable matter, is by no means clear; but I incline to the latter belief, and hold that the mischief actually commences in the blotch on the upper side of the leaf. How did that spot come there? Did an infectious zoospore, conveyed by the rain, fall upon it, and thus become absorbed into the membrane of this vegetable lung, and at once commence its deadly mission? Or was it the result of an electric shock? Who can answer? Following the operations of the disease in the leaf, however, we find that should an aqueous atmosphere continue, the blotch with its mildew will continue rapidly to spread, producing rapid decomposition akin to rottenness, and which emits a noxious effluvium. If, on the other hand, a dry atmosphere, accompanied with warm sunshine succeed, the foliage infected becomes rapidly charred and blackened, and the virus has spread into the stems of the haulm. The entire blackening or charring of the foliage and stalks speedily result. In large breadths of potatoes the first evidences of the disease are frequently overlooked, but the charring of the foliage soon makes it apparent, and this, the wholesale charring, is often taken for the disease itself, whereas it is but the natural sequence. It is from this latter belief that the commonly prevalent conception arises that large extents of potatoes have been suddenly struck with electricity. Who can shew that the potato possesses the least affinity to electricity?

We are unable to cope with the disease at its source, but we can do something to

alleviate its evil results. An assured courting of destruction of the crop is to put in with the seed any quantity of raw manure. Even decomposed vegetable refuse assists in its propagation. The safest manures for immediate application are the dry patent manures, of which we have an abundance. But the application of manures of a raw character to a previous crop, is the best mode of culture. Ally to this deep tillage, the soil well-sweetened by the previous winter's frost, giving plenty of space between the rows when planting, and, above all, avoiding the cultivation of gross-growing kinds, the rank haulm of which is sure to promote disease. Farmers generally, and the Irish ones especially, have need of a radical reform in this latter essential; and when they will submit to learn concerning this requisite, and other important points, from those who have made the culture of the potato a life-long study, then may we hope to experience some alleviation of the evils resulting from the potato disease.

SEWAGE IRRIGATION IN NORFOLK.

AT length Norfolk has added its name to the list of towns whose corporate bodies have recognized the importance of preserving sewage for the purpose of cultivation. Although long in abeyance, it will be seen from the following, which we extract from the *Norfolk Chronicle*, that the scheme has now taken a practical form, and a successful start has been effected :—

In the spring of this year, we noticed an experimental trial of irrigating the land, at Kirby Bedon, with the sewage of the city. The result of that experiment, so far as it went, was satisfactory. But it disclosed the fact that to put sewage upon the land in anything like its full strength, complete caulking of the sewers was imperative, so as to prevent leakage. The process of caulking was at that time in progress; and now at length hope, so long deferred, has been fully realized with regard to the entire works. Despite all that has been said in contrary anticipation, they are now completed, and since Monday week the sewage has been continuously delivered on to the land in the most satisfactory manner. The soil at Kirby Bedon is eminently adapted for cultivation by irrigation, and there appears no reason why the crops, when grown, should not meet with a ready sale in the market. Indeed, from the 20 acres of land irrigated by the "weak" sewage, supplied at the commencement of the year, a crop of ryegrass has been obtained; whilst that unirrigated has produced nothing. What may not be expected, then, when all the factories and houses of the city are drained into the sewers, and to effect which the engineer and clerk to the Board of Health have been empowered by the Sewerage Committee to take all necessary steps?

Before proceeding to give any details with regard to the delivery of the sewage at the farm, or as to the intended cultivation of the land, we may as well state here that the whole cost of the works will not exceed £110,000. This is an expenditure greater than was at first thought to be necessary, the original estimate being between £70,000 and £80,000. But against this must be set the fact that unlooked-for obstacles, requiring the application of no ordinary engineering skill and pumping power, have throughout had to be encountered. The magnitude of the works, and the fact that nearly the whole of the sewers have been constructed in and at a great depth below the level of the water, are of themselves sufficient to account for the inadequacy of the first estimate; but when to these is added the trying difficulty which

beset the engineer at Trowse, in the discovery of a bed of running sand, when a continuation of the chalk stratum was reasonably expected, the need of apology on this score is entirely removed.

Preliminary to an account of the irrigation of the farm, it may here be stated that all the old sewers have been connected with the main drains, and that nearly 3,000,000 gallons of sewage is sent each day to the penstock chamber at the pumping station at Trowse. Out of the penstock chamber the liquid passes into a well, and from thence is pumped through the 2 miles of pipes laid from the station to the farm at Kirby. The outlet at the farm is first indicated by a stone stile on the left hand side of the road from Norwich. A few yards in the field is an embarkment several feet in height. This embankment, which is ascended by some white brick steps, is flanked on either side by a deep ditch, and extends in almost a straight line to Whitlingham. Along it is laid a sloping duct lined with concrete, and about 4 feet in width, so that the sewage is rapidly carried to its destination; the speed having, of course, much to do with the mild form in which the effluvium from such liquid makes its appearance. Out of the 1300 acres hired by the Board of Health, and which have been sublet to various tenants, about 200 acres have been prepared for irrigation, and over these 200 acres the sewage is now being delivered. The "farming" is in the hands of Mr Westwood, who has had some experience in irrigating land with sewage, having been engaged in the application of it at Anerly, Surrey, and at Plaistow, Essex. The satisfactory results of the first-named application were stated by Mr Westwood to the Committee appointed by the House of Commons to inquire into the pollution of rivers by town sewage; and in the case of the delivery at Plaistow the results were no less satisfactory. The 200 acres we have mentioned are thus parcelled out—90 acres of rye grass, 50 acres of layer, 50 acres of park land, and about 8 acres tentatively planted with beet, carrots, cabbage, and kohl rabi. The land is of a very undulating description. On the upper lands, supply ducts are cut in connexion with the main carrier, and from these ducts, which are supplied or not as may be desired by the insertion or removal of iron sluice-gates, there are smaller subsidiary channels along which the sewage passes to the slopes, over which it falls, saturating the soil in its descent. Should there be any surplus sewage, it is trapped by channels farther down the slopes from it, when, in turn, it passes over still lower land. It will thus be seen that an equal distribution is obtained, and that the regulation of the supply is entirely in the hands of the farmer. About 3 acres of land sown with Italian ryegrass, will absorb the whole of the day's sewage from the city, and this will shew how porous and admirably adapted the land is for the reception of sewage. Even in its present form, Mr Westwood is of opinion that the sewage is strong enough in quality for growing ryegrass, although it would require to be of greater quality for fallow crops, and this improved quality, it is believed, will be obtained when the whole of the city is connected with the main sewers. As we have stated that some of the land has been experimentally set apart for roots and cabbages, we may as well add here that no very great results can be expected this year, owing to the lateness at which the sewage has been applied.

From these facts we think it may be deduced that, great as the expense has been, the object of the sewerage scheme in the diversion of the sewage from the river has been obtained. And not only this, but that by judicious management and enterprise in the sale of the "irrigated crops," there is reason to hope for some reduction of the fiscal burden upon the city, if not absolute proof that the sanguine expectation of profit will be realized.

IRRIGATION AT STOKE PARK.

FOR many years we have recommended Mr Brown's system of irrigation; it is much more worthy of our commendation now that he has placed his pipes below the ground, where covetous hands cannot steal nor horse-hoofs hurt the pastoral life-diffusing lead. We have received a report, the truth of which is attested by the owner of the farm Mr Coleman, which we subjoin. After personal inspection, we hope to give a fuller account in our next number.

This system of irrigation was laid down in the end of August 1870, upon 20 acres of pasture land, with a soil chiefly composed of a silicious clay, slightly calcareous, but from a want of loam mould is liable to become crust-bound in dry weather; it is, however, rich in the mineral constituents of a productive soil, and may be classed with that of the well-known brick earth of Slough. On the 5th of September, with temporary engine power, watering was commenced, the land was top-dressed with the British Rivers Irrigation Manures, and irrigation was continued at night until the end of the month. Notwithstanding the lateness of the season, the soil dried up, and vegetation having disappeared from the surface since the previous June, yet on the twenty-third day after watering, a very thick set growth of about 9 inches of superior feeding grass was produced, and by the middle of October it became a large crop, which was cut and given to stall feeding cattle, and the land after was successfully grazed with sheep until the end of the year, while the adjoining pasture—unirrigated, and in every other particular the same as that over which the irrigation had been conducted—remained unproductive, although rain to some extent had fallen during the autumn.

The value of the cut grass and the grazing upon the irrigated land may be estimated as equal to that of an average crop of turnips, as such grass, weight for weight, is equally rich in beef and mutton constituents, or its money value may be fairly put at £5 per acre for this autumn crop.

In the spring of this year, 1871, from delay in erecting the engine and pump now upon the irrigated land, operations were not commenced until the last week in March, and from five to six weeks of the best spring weather for watering and utilizing manure were lost in consequence, yet a very large crop of hay, chiefly perennial ryegrass was fit for cutting by the second week of May. It was estimated by practical judges to yield 2½ tons per acre, and from its having been secured in fine condition without getting any rain, it became the best description of good horse hay, and at the July market price its value in London is not less than £7 per ton, as hay not equal to it has been sold during the summer months from £8 to £9. On cutting this crop, a portion of it on the same day was removed and made into hay with that upon the unirrigated land, which gave facilities for at once watering the ground from which it had been taken. This had the effect of producing a second crop of perennial ryegrass of a large growth —which was fit for the scythe in the second week in July—such a result is, as a rule, unknown to agriculturists. A portion of the ground was measured, and the grass weighed gave a yield of 12¼ tons per acre, or about equal to 2½ tons of hay; while the unirrigated land, which had its first crop cut on the same day as the irrigated, only gave one-fourth of this weight as a second crop, although much rain had fallen during its growth, in the absence of which a mere fraction of this would have been the result; proving that even in a season such as 1871, the coldest and wettest (from April to August) there has been since 1862, that this system of irrigation has a three-fold advantage over any ordinary means pursued by agriculturists in the cultivation of grass or hay. This arises from the facilities given by the system for tempering the soil, and utilizing manure by the necessary moisture for promoting a perfectly developed and large growth; and from the operation of watering being conducted during the night, at such a trifling cost, a continuous process is secured by its application from March to November. The quality of such grass being suitable for the production of beef and mutton, without help from "feeding stuffs," is guaranteed; from the fact of its having been made at Stoke Park into the best description of hay: and this to the

intelligent grazier, will be sufficiently convincing that it is not to be classed with such as that obtained by the "flooding system" from "water meadows," or that produced by "sewage irrigation."

The successful results obtained at Stoke Park by the British Rivers' Irrigation, since last September, undoubtedly warrant the step just taken by Mr Coleman, in extending it over the whole of the pasture land upon his estate, to the east of the 20 acres put down last autumn. The underground system of the patentee has been adopted over the whole of it, and is one which recommends itself for every description of cultivation. Its distribution of moisture is that of a perfect rain-shower, according to the power used, over several acres simultaneously; and hundreds during the night, by the superintendence of an engine-man and a tap-boy, can be perfectly watered even during the hottest weather. The whole of the plant of which the underground system is composed, once laid down, is, so to speak, as permanent as land; it is perfectly secure from injury in the grazing of sheep, cattle, or horses, and will not interefere with steam or the ordinary means for the cultivation of land. There is nothing seen above the surface, and from the quantity of water necessary for irrigating being small, there is no place which possesses a well-spring with ordinary resources for storing the water during autumn and winter, but will enable its proprietor to irrigate many acres of land upon this system.

The estimated value of the produce upon the irrigated and unirrigated land, appended to this report, is for the cut grass and grazing of last autumn, with the hay crops in May and July of this year, which stand as the value for a season's growth. It may be considered that the unusually high price in June and July for hay, gives an exceptionally high value for the produce of an acre, but if put at the average, £4, 10s. per ton for the last five years, and take into account the want of an average temperature for conducting irrigation during the spring and summer months of this season, undoubtedly one of the coldest there has been for the last ten years, with the lateness of commencing the irrigation—the end of March instead of the middle of February—will sufficiently account for the loss of from 1 to 2 tons of hay; this, added to that obtained and taken at £4, 10s. per ton, combined with the autumn grazing from August to November, would amount to not less than £35, and is not overstating the value of an acre of irrigated land, from similar results having been obtained by this description of cultivation.

The item for fuel and superintendence in the report (30s. per acre), is 50 per cent. more than it would have been, had 100 acres been under irrigation. The consumption of the fuel would not have exceeded 5 lb. per horse power per hour, and for twelve hours' working during one hundred nights (about the average time necessary in a season), with coal at 15s. per ton, is under 5s. per acre, and the wages of an engine-man at £1, and a tap-boy at 10s. per week, from February to the end of September, and charging the whole of their time against the irrigation, is under 10s.; but the same superintendence with adequate engine power would work 500 acres in the same time, and reduce this item of 10s. to 2s., and with a further saving of fuel, which would undoubtedly be obtained—the amount of 30s. for it, and superintendence, would then stand at 5s. to 7s. 6d. per acre, while that for manure, in comparison with the amount named in this report, would, for grazing and cropping, be reduced by one-half. The item for dung costing 16s. per load, includes the cost in London, cartage to, and with 20 miles of railway carriage, 2½ miles cartage to Stoke Park, labour in turning over the manure during its being further decomposed, cartage to and spreading upon the land, and estimated value for the loss of weight the manure sustained by the time it left London in August 1870, to January 1871, is an expenditure for manure upon the surface, that no other system of cultivation, taking the risk of the weather, could have shewn a profit upon, such as the British Rivers Irrigation has shewn at Stoke Park during the present season.

Particulars of value of produce and cost of production of grass and hay upon the irrigated and unirrigated land at Stoke Park.

UPON THE IRRIGATED LAND.

COST OF PRODUCTION PER ACRE.

Interest upon plant at 5 per cent.	£1	10	0
Superintendence and fuel	1	10	0
Cost of top-dressing with British Rivers Irrigation Manure, September 1870	2	10	0
Ditto, with London horse and other dung spread upon the surface, 10 loads at 16s.	8	0	0
Ditto, with British Rivers Irrigation Manure in March 1871	1	16	0
Ditto, in May 1871	1	4	0
Cost of making first and second crop of hay	2	10	0
Per Acre	£19	0	0

VALUE OF PRODUCE PER ACRE.

Value of first crop of grass and grazing, autumn, 1870	£5	0	0
Ditto, spring crop of hay, 1871, 2½ tons at £7	17	10	0
Ditto, summer crop of hay in July, 2½ tons at £7	17	10	0
	£40	0	0
Less by cost of cultivation per acre	19	0	0
Balance in favour of produce	£21	0	0

UPON THE UNIRRIGATED LAND.

COST OF PRODUCTION PER ACRE.

Top-dressing with British Rivers Irrigation Manure, Febuary 1871	£1	16	0
Ditto, in May	1	4	0
Cost of making first and second crop of hay	2	0	0
	£5	0	0

VALUE OF PRODUCE PER ACRE.

Produce from June to December 1870	No value.		
Hay crop cut in May 1871, 1½ tons at £7	£10	10	0
Ditto, in July, fourth of the irrigated crop, of 2½ tons, at £7	4	7	6
	£14	17	6
Less by cost of cultivation per acre	5	0	0
Balance in favour of produce	£9	17	6

Stoke Park, July 1871.

Since irrigation was commenced upon the underground system for the autumn grazing at Stoke Park, in the second week of August, favourable weather, with a high temperature, has prevailed; and an extraordinary large growth has been produced upon the irrigated land, considerably more than that obtained for a similar period during the months of May, June, and July, while the park and hay land unirrigated has been scorched and dried up.

TURNIP GROWING AND THE PRODUCTION OF SEED.

THE following interesting letter has been communicated to the *Falkirk Herald*, by Mr John Buncle of Springfield, by Linlithgow. The observations, Mr Buncle says, are the result of upwards of thirty years' experience in the growing of turnips to perfection in the field. There are some valuable hints submitted regarding the increased labour required at the present time in cultivating this kind of crop, compared with what was formerly the case:—

The turnip was not familiarly known to the Greeks, but was well known to the Romans; and all that can be gathered on this subject from the writings of the antients renders it probable that it occupied nearly the same place in Roman culture as it does in British husbandry in the present day. Columella recommended that the growth of turnips should be abundant, because those which were not required for human food could be given with much advantage to cattle; and Pliny and he concur in their testimony that this produce was esteemed next to corn in utility and value. It is very likely that the garden culture of the turnip was introduced by the Romans into this country, and that, like some of the fruit trees which they had transplanted here, though neglected, it was never altogether lost. It is not until near the close of the seventeenth century that we can find any account of this root being thus cultivated in fields in any part of this country.

It is under a hundred years since Mr George Henderson, then farmer of the Burgh Muir of Linlithgow, Bonnytoun, and Wester Bonhard, tried to grow turnips in the fields. His plan was to sow them in rows on level ground, thin them afterwards, draw up the earth about them with hoes (for there were no ridging ploughs then), the same as is now done with potatoes. He could not get them to grow to please himself; but through a conversation one day with his intimate acquaintance, Provost Clark of Linlithgow, who was a Dutch merchant, and was often upon the Continent, he was informed how large they grew the turnips in the fields in

nd, and advised to go over to Holland arn their method of rearing them. Mr erson took the Provost's advice, and over and ascertained the Dutch method owing turnips in ridges, and when thin- them to take away the earth—the same way as is done at present. In words, it was Mr George Henderson introduced the proper way of growing os in the fields to perfection, as now ally practised over this country. At ime farmers came from far and near to is new method of cultivation. Some too soon when he was thinning the os, and declared he never would have os by taking away the earth as he was ; but when they came back a second they saw his new plan in a different and highly approved of it, and it soon ards became general.

> Man and his labours pass away,
> But Nature spurns thy power, Decay.

hall now endeavour to give my expe- and observations of field turnip ng for the last thirty years. At that Mr David Roughead, of Haddington, nown in this district to be an eminent r of turnip seed, which he obtained only selected roots, selling only such as he to be of the best kinds. All his seeds d out magnificently, as far as came my notice. I also knew some farmers picked the best and largest of turnips, transplanted them early in spring in a le place for producing seed for their own g; indeed, all the seed at that time was ced as above described, and there was ch trouble and defects in growing os then as now. I have seen the green- berdeen and purple-top Aberdeen grown my own farm, some of them weighing . imperial per turnip; and all the os at that time that came under my ob- ion for miles distant grew well—scarcely ield being defective, unless too late of sown. I am quite aware there are soils more suitable for growing turnips other soils. For instance, they all grow easier and larger upon a light soil than upon a heavy clay soil; and no such difficulty is felt in getting them sown at a proper time upon a light soil as there is of getting them sown at a proper time upon a heavy soil, owing to the difference of seasons, over which man has no control. But that is not what I intend clearly to bring out. I have been asking some farmers if they had any idea of what was the reason that their turnips did not grow now as formerly, and if they could account for the change. Some thought that there had been turnips too frequently upon the same ground; other farmers say that some land will not produce healthy turnips. There are some who will not offer for a farm unless they get a guarantee that the land will not produce diseased rooted turnips. Under these circumstances it is becoming a most important matter to have the problem here involved fully inquired into, and, if possible, set at rest. The evil is, in the first instance, injuring the farmer, but ultimately it will extend its influence to all classes in the country. It is only about eighteen years back that the root disease of turnips was first observed by me in this district, and I have noticed its progress since to be very rapid, and I am of opinion I trace it to its true origin. I will, in the first place, describe the turnip how it is affected. When it is about the size of an apple it begins to split up from the bottom about one-third of its size upwards at right angles, and throws down four small roots, one at each angle (when a healthy turnip should only have one strong root so far down till it branches out into numerous smaller fibrous roots). The diseased turnip thus lingers in misery for a time. I have known a field of 16 acres imperial go down in the course of two weeks to be worth not a-twentieth part of what would have been their value had they been good turnips. I know the disease so described by me goes under different names in different localities. I will, however, continue to call it by the root disease.

In the second place, I entirely blame the seed as being the cause of this root disease. If we condescend to examine the way the turnip seed is now produced, and compare it

with the description of the mode pursued thirty years ago, as above stated, we will have no difficulty in seeing that it is the real and only source from which sprung the failure of the turnip crop.

In the third place, I give you a true account of how a large proportion of the seed is now produced for field turnips. Fields of hay are cut down, hurriedly ploughed, and sown with turnip seed broadcast. They are neither hoed nor cleaned in any way, but allowed to grow as they will, and run to seed when they like the following year. These turnips are never the size of apples. How can they be expected to produce proper seeds when there are not the proper juices in themselves? I see this method of raising seed for turnips is followed in many fields even between Linlithgow and Edinburgh, as well as elsewhere. My experiments have been very numerous, and the whole of them give the same results; therefore, I do not now scruple to offer my humble opinion that I am right.

I now give you an account of the appearance of the good and bad seed when examined with a powerful magnifying glass. The good seed is larger, darker in colour, and glossy. The bad seed is smaller, of a brown colour, and wants the gloss; but this is too fine an observation to depend upon for buying the seed by. If a magnifying glass of sufficient power is used to shew every turnip seed the size of a large blackberry, the farmer will plainly see that by sowing some seed (such as I have got samples of) he cannot expect a crop of turnips, but ruin himself by purchasing the trash referred to; and it must be no joke to a farmer to have no turnips to feed his cattle when he expected to have an abundance.

I would suggest as a proper method of putting an end to this practice, for the agricultural associations to take up the case and acquaint all sellers of seeds that no farmer would buy any turnip seeds without a guarantee that it was entirely from full-grown turnips, and that they would hold the sellers responsible. This would make all the growers of the inferior seed give up growing it, for they would not get it sold.

THINNER SOWING AND IMPROVED CARTAGE.

By Mr J. J. Mechi.

I CONTINUE my comparative trials of thick and thin sowing, and send you this year's results. The field was drilled on November 10, 1870, with my usual quantity, 4 pecks per acre of Club-headed Rough Chaff White Wheat. Four lands in stretches towards the centre of the field were drilled with only 2 pecks per acre on the same day as the other portions of the field. It was on a clover lea, first mowed for hay, and the second growth folded with sheep, eating cake, &c., as is my usual custom. In the early growth of the crop, the thinner sown was distinctly visible, but as the spring advanced the crops became equally thick, and no difference was perceptible, either during ripening, cutting, or in the stubble after cutting. This was the opinion of all those numerous farmers who inspected it during its growth. Two exact portions were measured off, cut and threshed, weighed and measured. There was an equal number of sheaves from each portion, and an equal weight of grain. The straw and grain were both brighter from the thinner sown, and this I have always found to be the case, with a single exception. The thin-sown sample would command 1s. to 2s. more per qr. than the thicker sown. Weight per bushel:—thick-sown, 60 lb.; thin-sown, 61 lb. Wheat this season does not weigh so well as in drier seasons. The name of the field is Ash Field;

the comparative lands were opposite the stable door, which will be remembered by those who saw it. The whole field was estimated at from 9 to 7 qrs. per acre—the trial square (16 roods) gives a return of 54 bushels per acre. When the whole field is threshed and dressed, the quantity shall be accurately given. I sold some white wheat yesterday at 57s. per qr. This field's produce is of rather better quality, and would probably command 58s. to 59s.

The result of my long-continued experiments proves unmistakeably that where the farming is good on well drained and deeply cultivated soil, our usual quantity of seed is a very great and wasteful mistake. I lay down no particular rule, but recommend each farmer to satisfy his mind by comparative trials which quantity of seed is most profitable to him under his peculiar circumstances of soil, climate, and style of farming. By comparative trials I found that by putting in 1 bushel as against 2 it increased my return in wheat 30s. per acre. The average of Great Britain is stated to be 3 bushels of wheat per acre; this must be far too thick sowing: as a general rule, the higher you farm the less seed is required. Much wheat this year was raised from the ground by the winter's frost, and some was injured by wireworm. Although heavy land, I Crosskilled this field well. This not only rebedded the roots of the wheat, but also arrested wireworm. Salt on the lighter land, after Crosskilling, saved the plant, and gave me an abundant crop. I think it is wrong to go on sowing the same quantity of seed as our forefathers did when broadcasting, without taking into account the altered circumstances, such as the drill, drainage, and higher farming. Every farmer should make comparative trials. Two visitors from Liverpool assured me yesterday that as much as 4 and 5 bushels of wheat are sown per acre in that neighbourhood, the return being only about 4 qrs. per acre. The average of the kingdom is stated to be a return of ten kernels for one; mine is an average of forty for one. I sow 6 pecks of barley, and 8 pecks of oats per acre. In many foreign countries, where the weeds are allowed to grow with the corn, the return is only five or six for one. My wheats are always once or twice horse-hoed, and hand-hoed in the rows. If the land is loose, we Crosskill once or twice before hoeing. Much corn gets diminished in crop and injured in quality by too thick sowing, which causes an early falling of the crop.

It would be very unreasonable, and contrary to all evidence, to suppose that the public mind can be speedily removed from a rut in which it has travelled for ages. One of these ruts may be called "the waggon rut;" and yet if we test the question by the reliable expedient of comparative trial and self-interest, the agricultural mind ought to come out of that rut immediately; but I write this for the next or rising generation. This question was long ago settled in favour of the carts, as recorded in early numbers of the Royal Agricultural Society's *Journal* (vol. ii., p. 73; vol. vi., p. 156; vol. vii., p. 375). Every one interested should read Mr Hannam's admirable paper, illustrated by diagrams, in vol. ii., p. 73. I wonder how much is the annual loss inflicted on British agriculture by the use of waggons, for although the question was settled by comparative trial, very few farmers either knew about it or believed in it, for still waggons continue to be the order of the day, although a farmer seldom drives to the market on four wheels. As there are 23,000,000 acres of arable land in the United Kingdom, in addition to 23,000,000 acres of permanent pasture, there are probably many more than 500,000 waggons, costing (as an average proportion of road and harvest waggons) £30 each, or £15,000,000, whereas the best made harvest carts would cost less than half that amount, and thus effect a saving of capital of probably £7,500,000. Mr Bowly, of Cirencester, in his prize essay, Royal Agricultural Society's *Journal*, vol. vi., p. 156, found his saving to be £40 out of every £100. But it is not alone in loss and interest of capital, but also in wear and tear of horse-flesh, and loss of time in horse and manual labour. Let me give an instance of this, first observing that although some twenty-five

years ago my men were all in favour of waggons, they would now look upon them as clumsy encumbrances prolonging their labour, and thus causing deductions from their harvest earnings. We use long, wide, and low carts, about 12 feet long, 7 feet wide, and 3 feet 6 inches high—weight about 7 cwt. They are like that illustrated by Mr Hannam in vol. ii., p. 73, of the Royal Agricultural Society's *Journal*. The cost varies from £13 to £15 —they were formerly cheaper. We use one horse at harvest, and a boy to drive; they carry about 150 large wheat sheaves. They carry to market 10 to 12 qrs. of wheat with two horses, half that quantity with one horse. They do not press upon the horse either up or down hill; they are convenient for coal, but cannot be tilted. Two good men will pitch and load from 60 to 80 qrs. of wheat in a long harvest day, and one man will unpitch them. Three carts and three horses will convey this quantity, with one boy to drive; but an extra cart and one more boy are required when the distance is greater. There is no binding the load. No such satisfactory practice could be done with waggons, and the cost would be in every way much greater.

IMPORTS AND EXPORTS OF AGRICULTURAL COMMODITIES.

NOTWITHSTANDING the glut in the London market of foreign cattle lately, we have to record, on the authority of the "Accounts relating to Trade and Navigation of the United Kingdom," a falling off, in the month, of oxen and bulls of upwards of 2000 head—the number received during August of this year being 13,929, as against 16,104 in the corresponding month of last year. In the case of cows, however, there was an extraordinary increase, and it may be doubted whether that increase was of advantage to the country. For if it be true that all the ills that four-footed animals are heir to, come from abroad, then the increase of cows must be looked upon as a source of great danger. We have something like 12,000 extra on the month, no fewer than 13,099 having being received during this August; while last year only 1446 reached our shores in the same period. The number of calves received was also far in excess of that coming in the corresponding month of 1870—being 8025, to compare with 3801.

The numbers of sheep and lambs were nearly doubled—106,521 being the number imported; the corresponding number in the like month of last year amounting to only 55,761. Swine, also, came in larger numbers during the month—10,098 being registered; last year, in the same time, just 9597. Bacon more than doubled in quantity—the precise figures being for the month of August 1870, 32,999 cwts.—this year it was 75,607.

Of salted beef, however, we had considerably less, no doubt owing to the fact that we had such an increase in the returns of live produce. Of meat, salted or fresh, there was a slight decline; but in meat preserved otherwise than by salting, a very large increase, the figures in August this year, being 19,877 cwts.—in the like term of last year, 1414 cwts. These statistics confirm the statements which reach us from abroad—that meat preserving is becoming very profitable. While on the subject of meat, we may also notice that there was a large augmentation in the imports of hams, the quantity received during the month being 3366 cwts., as against 810 cwts.; but of salted pork we received only 7892 cwts., as against 13,034 cwts.

During August we imported a much larger quantity of wheat than in the corresponding period of last year, viz., 4,110,189 cwts., as against 3,056,936 cwts. During the

eight months of this year that have passed, the total quantity of this commodity imported was 23,496,867 cwts., for which we paid £13,744,940. Last year, up to the same date, we received only 19,788,933 cwts., and the cost was £10,191,049. Barley was in much larger supply, at a smaller outlay. Oats we received in smaller quantities. About peas the same has to be said, but beans we imported in greater quantity.

The following tables shew the quantities and the values of corn received during the month, with, in the case of wheat and wheat meal and flour, the sources whence derived:—

QUANTITIES.

Wheat.	Month ended Aug. 31, 1870. Cwt.	Month ended Aug. 31, 1871. Cwt.
Russia	913,494	1,582,045
Denmark	41,083	18,500
Germany	739,353	299,468
France	1,800	35,211
Austrian Territories	—	12,596
Turkey, Wallachia, and Moldavia	14,591	271,022
Egypt	3,500	116,643
United States	838,660	1,211,869
Chili	78,130	3,360
British North America	414,042	444,166
Other Countries	12,283	115,309
Total	3,056,936	4,110,189

VALUE.

Russia	£482,958	£880,821
Denmark	23,623	11,755
Germany	452,507	196,615
France	998	16,293
Austrian Territories	—	9,643
Turkey, Wallachia, and Moldavia	7,052	142,326
Egypt	1,692	59,233
United States	459,610	703,746
Chili	48,831	1,450
British North America	227,723	254,646
Other Countries	8,013	64,727
Total	£1,713,007	£2,341,255

QUANTITIES.

	Month ended Aug. 31, 1870. Cwt.	Month ended Aug. 31, 1871. Cwt.
Barley	568,728	895,172
Oats	1,509,685	1,352,865
Peas	284,851	72,908
Beans	96,171	310,063
Indian corn	1,984,159	1,990,731

VALUE.

Barley	£227,678	£307,930
Oats	670,459	483,938
Peas	125,380	30,969
Beans	43,411	122,881
Indian corn	743,266	719,865

QUANTITIES.

Wheat Meal and Flour.	Month ended Aug. 31, 1870. Cwt.	Month ended Aug. 31, 1871. Cwt.
Germany	31,343	60,501
France	29,877	9,796
United States	141,118	134,879
British North America	64,363	44,370
Other Countries	111,998	88,452
Total	378,699	337,998

VALUE.

Germany	£24,291	£57,091
France	24,649	9,290
United States	101,722	109,484
British North America	47,200	33,175
Other Countries	86,878	86,061
Total	£284,740	£295,101

With reference to other provisions we notice an increase in the import of butter, of upwards of 17,000 cwts., and of cheese more than 45,000 cwts., the exact quantities being, last month, butter, 122,452, and cheese 207,120 cwts., and the respective costs, £626,473 and £555,360. A country so well adapted as ours for the manufacture of dairy produce, should not be so dependent on the foreigner, as these statistics shew it to be.

Eggs we received in diminished numbers—only 274,026 "great hundreds" being imported during the month, as against 339,331 in the corresponding period of last year. It would seem from this, and we would be glad if it were really the case, that poultry are being more attended to at home than they were wont to be.

Foreign potatoes were in much less demand this year than last—the amount we paid for them during the month being only £5800. In August of 1870, we disbursed for the same commodity £13,716, and in the corresponding month of 1869 no less than £30,161. For poultry, game, and rabbits, alive and dead,

we paid £5039, about £1300 more than in the corresponding term of last year.

The imports of clover and grass seeds exhibit a great decline, being only 2297 cwts., not a half of what they were in August of 1870, nor a-sixth of the quantity received in 1869. We had, however, a much larger supply of rape, 91,807 cwts., to compare with 38,520 cwts. The quantity of cotton seeds received amounted to 6928 tons; and of flax and linseed 144,676 qrs., much about the same as the corresponding month last year.

There was a tremendous increase in the import of hops, the quantity received amounting to 20,504 cwts., to compare with 1160 cwts. in August of last year. The expense was more than proportionately great, the sum paid being £63,400, while in the like month of 1870 it was only £2803.

In the course of last month we imported 17,000 tons of bones more than in the previous August, the quantity being 9953 tons, and the value £63,740, to compare with 8249 tons and £52,933. It will thus be seen there was little difference in the value of the article, but what little alteration there is, is in favour of the buyer, to the almost inappreciable extent of a penny per ton—the price this year, as given in the Returns, being £6, 8s. 2d. per ton; last year, it was £6, 8s. 3d.

There is a great falling off noticeable in the imports of guano, only 6225 tons being shipped, as against 32,078 cwts. The cost is £54,203, to compare with £418,926 last August. If there be no mistake in the Returns, the quality must have been as deficient as the quantity—the price, we find on working the matter out, being only £8, 14s. 1d. this year, while in the same month of last year, the value was £13, 1s. 2d. We cannot discredit the accuracy of the Accounts, but such a discrepancy requires explanation. To tell where the guano came from, which the Returns ought to do, might throw light upon the subject.

There was a slight falling off in the imports of oil-seed cakes, there being about 900 tons less received than in the corresponding month of last year—the precise figures being 12,983 tons, as against 13,891 tons. The cost, however, was greater, notwithstanding the diminished supplies, the sum paid last month being £137,643, as against £113,112, in August last year.

Our imports of wool during August were greatly in excess of those of the corresponding month of last year, although Australia shewed a falling off. To the continent of Europe, and what are described as "other countries," it will be noticed from the subjoined table, the excess is due.

QUANTITIES.

	Month ended Aug. 31, 1870.	Month ended Aug. 31, 1871.
Wool, Sheep, and Lambs.	lb.	lb.
From Countries in Europe	1,844,139	9,562,039
,, British Possessions in South Africa ...	1,731,621	2,792,393
,, British India	1,294,871	1,775,301
,, Australia	10,871,697	8,579,851
,, Other Countries	1,277,975	3,947,273
Total	17,020,303	26,656,857

VALUE.

From Countries in Europe	£93,754	£534,347
,, British Possessions in South Africa ...	108,226	154,308
,, British India	39,116	63,820
,, Australia	709,255	526,775
,, Other Countries.....	41,512	155,084
Total	£991,863	£1,434,334

So far, we are debtors to the foreigners for agricultural produce, and that which produces it: let us see what we have on the credit side of the ledger. We have only "a beggarly array" (if we may be permitted the expression) "of empty benches." In the month, £27,929 butter, £6850 cheese £33,391 horses—the great majority of which went to France—and £69,059 wool.

The Garden.

ORNAMENTAL CONSERVATORY.

ONE of the greatest achievements in hot-house buildings is the modern conservatory. It is considered one of the luxuries pertaining to a most complete whole in gardenesque adornments. Its place and position, notwithstanding all that may be said to the contrary, is as an adjunct to the mansion house, or castle, or villa. A well-proportioned house, suited to the character and style of the architectural pile which it adorns, and is adorned in turn, is one of the greatest achievements in hothouse building. The architect has to consider more than mere æsthetic effect. He has to take cognizance, which, by the way, he often doesn't, of what climate would be, and what would not be suitable for the growth and health of the plants that are intended to beautify the interior. In days past, there seemed to be an absence of forethought, or a want of knowledge of the requisites that plant life demands, and so we had heavy massive stone erections, grand enough in themselves as subsidiaries to the principal pile or block, but so dark and dreary-looking that what plants were put in alive and well became wan-coloured, their branches elongated without that consolidation of tissue, and their leaves were shooting forth without that amount of chlorophyll which is so necessary towards maintaining health and increasing the dimensions of the plants in a stable way, that death was the inevitable issue.

This state of things, however, was not long to continue. Plant admirers and plant collectors set their face resolutely against the prevailing custom or fashion of conservatory building, and determined upon insisting that light, and light in abundance, must be presented, whatever were the character and style of the house. And so we have had in modern times both elegant and useful houses, in keeping with the style of architecture—be it Grecian or Gothic, or any other style; and what with the other adjuncts of lawn, or pleasure ground, or flower garden, we have had, and continue to have, many pleasing combinations. We intend from time to time to present a set of houses of all kinds, combining elegance with economy. In the meantime, by the kindness of Messrs W. L. Boulton & Co., Norwich, we illustrate the following group, as presenting, more or less, features of importance for such of our readers who may be inclined to build, and who doubtless desire to have such plans before them as may meet their individual wants, before finally coming to a decision.

The ornamental conservatory, fig. 1, is very suitable for an adjunct to any villa of Grecian style of architecture, where symmetry prevails to a marked extent, and symmetry is always more or less pleasing to the eye of man. It is sufficiently lofty to admit such conservatory plants as Palms, Tree Ferns, Camellias, Australian Dracænas, and such like plants that do best in a mild atmosphere. As a rule, tropical conservatories are few. The plants that are generally grown and flowered, or grown for other beauties, are too subject to the inroads of insects, and require too much attention for the privacy which it is desirable at all times to have about conservatories in connexion with mansions. Moreover, the temperature is too stifling—more like a preparatory room for a Turkish bath, and thus not by any means an eligible atmosphere for either ladies or

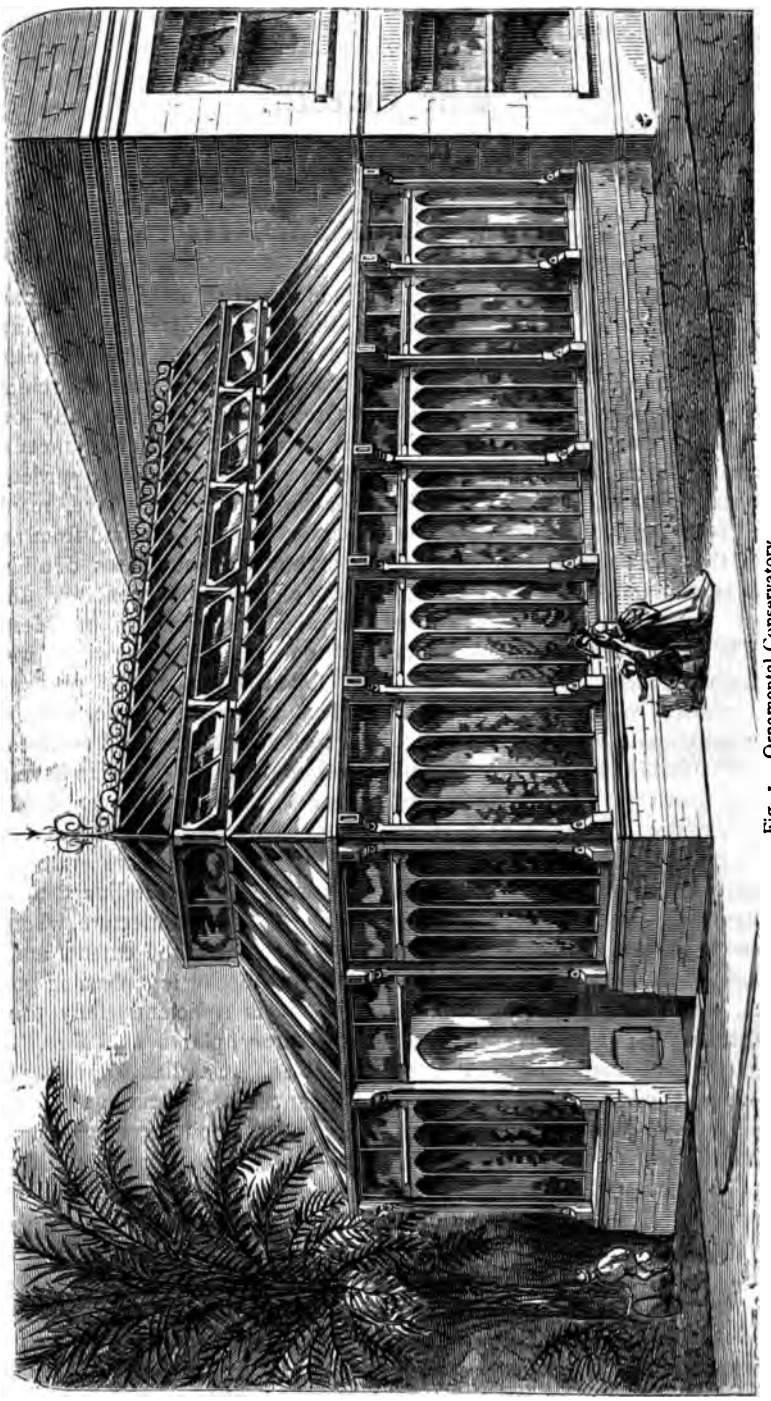


Fig. 1.—Ornamental Conservatory.

ıtlemen to remain long under its in- ence. A cool conservatory, on the other ıd, is a most desirable retreat during : summer day—shaded as it is from sultry ı heat. The one under review is neat, not an elaborate design, involving cost beyond at many would care to disburse, and ıuld well become almost any description of ɔdern style of villa. The interior, as well the exterior, is highly ornamental. It is nerally constructed with handsome iron ders, which give both style and durability the structure. Its parts are principally nstructed of wood, and the glass is of long

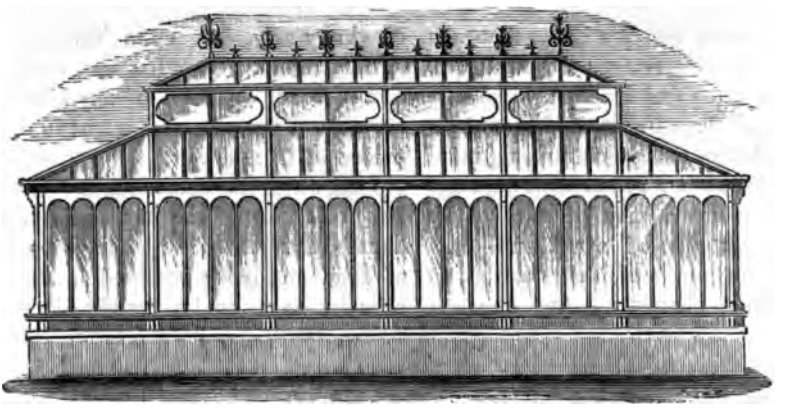


Fig. 2.—Side Elevation of Conservatory.

ıgths, not destroying the easy stylish effect ıich characterizes the whole. Ample means

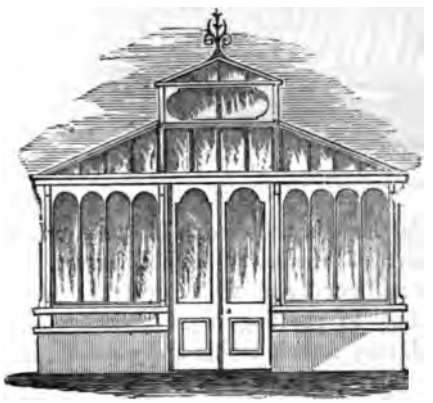


Fig. 3.—End Elevation of Conservatory.

ır ventilation is secured in the form of house, ithout affecting the stability of its principal ırts. This is of no small importance in itself. Stagnant air is about the worst-conditioned atmosphere that could be provided for general plant life, more particularly if the atmosphere be of considerable dimensions. Lofty houses and immobile air are detrimental in the highest degree to the health of plants, only second, indeed, to deficient light. We have in the house before us the least opposition possible to the diffusion of light ; ample means for the circulation of air, and the artificial canopy by no means beyond the capacity of plant-life in general. Such a conservatory as this, and such as the one engraved, fig. 3, may be reckoned general and safe repositories for the most of flowering and foliaged plants that are deputed for the general furniture throughout the season. Bulbs and Pelargoniums, and Fuchsias and Achimenes, and Dracænas and Crotons, and Balsams and Chrysanthemums, and Liliums and Cyclamens, and Gesneras and Begonias, and Chinese Primroses, and many plants which we meet everywhere, may be flowered or grown after a certain stage of adultness in such houses, and look better than they would do in the pits or frames in which they were cultivated, from the charm of association and the general symmetry, and neatness, and order, that prevail in a well ordered, well furnished conservatory.

The one shewn by the side elevation, fig. 2, is much cheaper put up than that engraved fig. 1, but it has a good appear-

ance, and may be set down in juxta-position to a house without being attached to it. This description of style will look best in a flower garden; it may be in immediate contiguity to the house, without affecting it. Let the principal block be however ornate or however elaborate, only it must not be Gothic or Gothic-like. A different description of conservatory must be decided upon to suit at all times the style of the mansion or villa. A better idea will be presented to the reader by the introduction of the end elevation, fig 3. It will be seen that you have a good plant-house at a minimum cost, taking all things under consideration, neither too lofty nor yet too low for the comfort of individual observation, and for the well-being of the plants.

THE TENANT'S GREENHOUSE AND VINERY.

WHEN people tenant a house that may have a conservatory as an adjunct, some of them often feel inclined to enlarge the horticultural department, and would do so but for the fact of fixtures on rented ground belonging to the owner. Much heart-burnings and legal interference may be avoided by causing the erections of wood and glass necessary for the growth of flowers or fruit, to be of a portable character. Any one can evade the strictness and conservative reading and rendering of the law, by ignoring the brick and the stone and mortar foundations and superstructure, and taking to the wood as a frame-work entirely. The house then may be made up into sections, that take down and can be put up at pleasure, so ready and handy and fertile are the resources of those who cater for the public in this as in every other way. Any one may have a greenhouse or vinery now, just upon the same terms as they can have a garden seat, or an arbour, or a piece of furniture of any kind. Being portable, it belongs, as it ought to do, to the owner of it, and not to the owner of the ground, which it in some measure embellishes. Fig. 1 is one of the best forms of plant-houses that are devised, giving the maximum of light, and being confined in atmosphere-capacity so as to be readily heated when artificial heat is required. It is not one of the sort of rough-and-tumble houses, but stable and good, and, with care in the way of attending to painting when painting is required, may remain stable and good for half a century. Fig. 2 represents a suitable building for a Vinery—the sort of hipped span being useful for throwing in additional light upon the Vine-leaves. Moreover, bulbs often form a sort of dividing line between

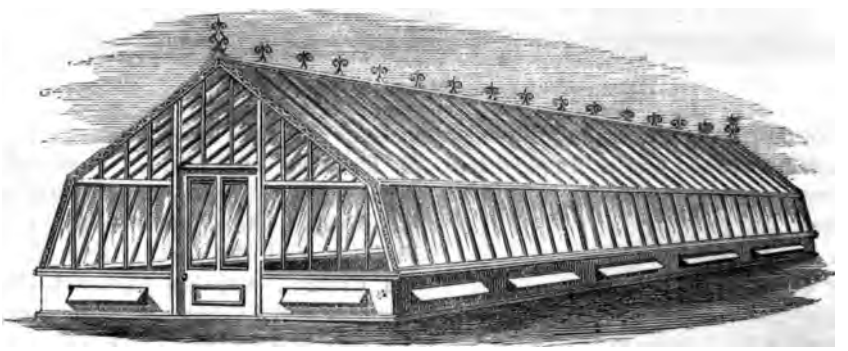


Fig. 1.—The Tenant's Greenhouse.

Villa boundaries, and they need not be so lofty as a garden wall ostensibly built for garden purposes. The extra sloping sash can be reared at less cost than either brick or stone wall, and it has the merit of not being opaque. When fruit-growing is now-a-days so much in the ascendant, we could not recommend a better form of house for either the Orchardist or the Vine-grower, or both combined, this can be well and profitably done, if only the means are used. Mr Fountaine deserves the thanks of every horticulturist for his novel and ingenious, yet simple mode of managing Orchard-house trees and Vine culture, and managing it well, too. The houses are erected by Messrs Boulton & Co., Norwich, who have furnished us with the cuts for engraving.

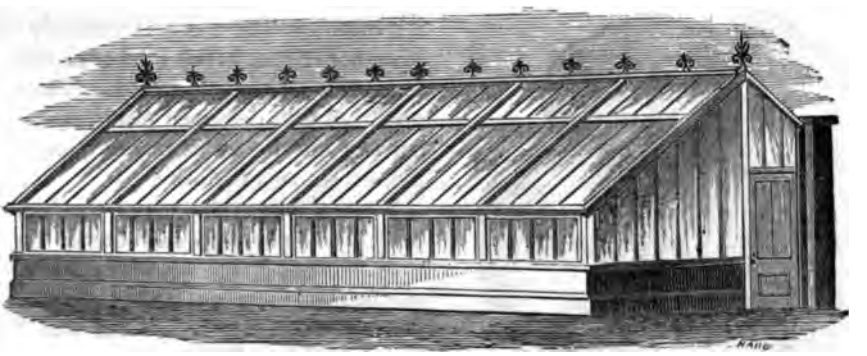


Fig. 2.—The Tenant's Vinery.

SEXES IN STRAWBERRIES.

THE Strawberry, in its natural or wild form, produces flowers containing both stamens and pistils. These two organs are quite distinct, the stamens being much the larger and more prominent of the two, and always surrounded with pistils, and each is terminated with a knob, called the *anther* (*a*, in the fig., shews these organs somewhat enlarged).

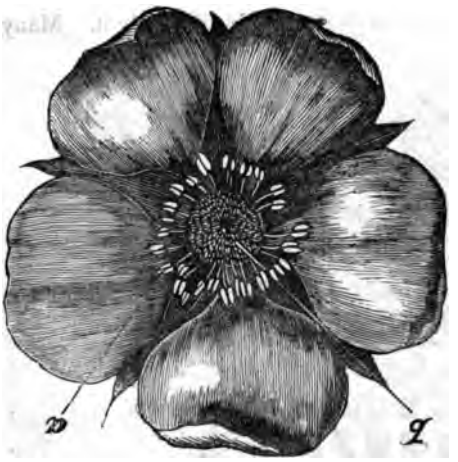
The stamens vary in number from ten to twenty, and are situated on the calyx.

The pistils are small and very numerous, situated in the centre of the flower (*b*), and upon a pulpy receptacle which enlarges and becomes what is generally referred to as the fruit.

By comparing the accompanying illustration with any variety that has perfect flowers, the two kinds of organs may readily be distinguished. Although this is the true form of the flowers of most of our cultivated as well as wild sorts, still an occasional variation is seen, especially among what is called improved varieties. The first and most noticeable change is a diminished number of stamens, the flowers of some seedlings not having more than four or five, and occasionally these are only partially developed. In others, the stamens are entirely wanting, but the pistils are perfect and abundant.

Now, as each pistil is united to an embryo seed, which must be fertilized with pollen from the anther of a stamen before it can mature, it is quite apparent that these pistillate flowers require foreign aid. In practice this is found to be true, and varieties with perfect flowers are always intermingled or placed near by the imperfect or pistillate, to aid in fertilizing.

In more familiar language, these two classes of Strawberries are called female (pistillate), and bi-sexual (hermaphrodite). But such a thing as a male Strawberry (one with only



Organs of Strawberries, enlarged.

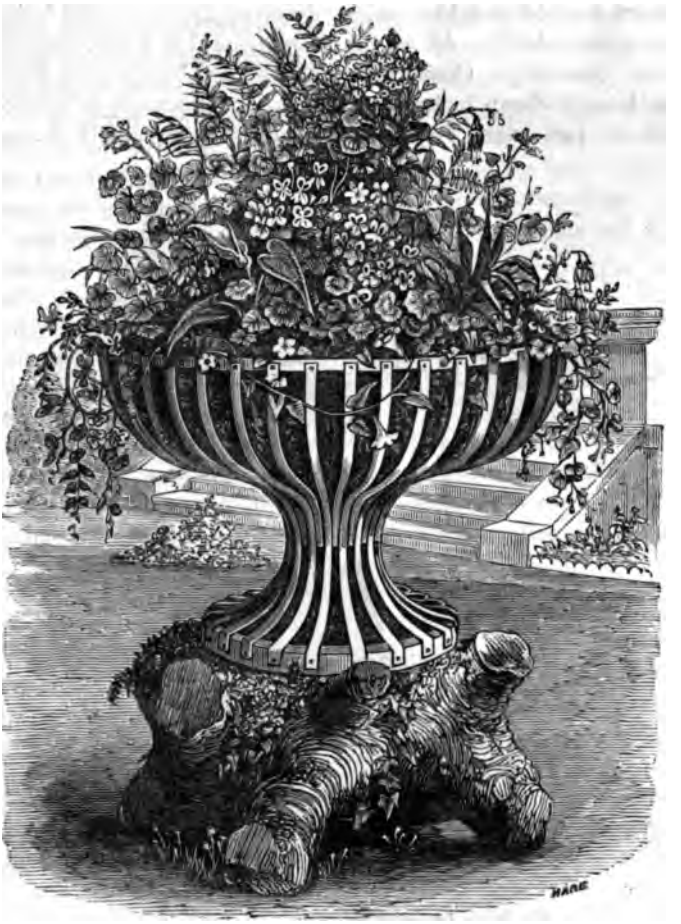
stamens) bearing fruit never existed, except in the imagination of some crazy horticulturist. How such a misnomer was ever described or crept into any books of our horticultural *litterateurs*, we are at a loss to determine, unless it was in consequence of the variation in number of stamens in different varieties, and thus a goodly number were called staminates, and those with less, hermaphrodites; but there is certainly neither sense nor science in this kind of classification. It is certainly true that seedlings have been produced with deformed pistils, consequently barren; but no one cultivates them, or ever did, except as a curiosity.

These freaks in the sex of the Strawberry have been observed and known for more than a century, but no particular attention was paid to them until two American fruit-growers, Nicholas Longworth and William R. Prince, aided by two or three other gentlemen still living, started the theory that pistillate varieties were, in consequence of the peculiar structure of their flowers, more productive if properly fertilized, than those having both sets of organs complete. Practical experience of hundreds of Strawberry growers during the past twenty years, has proved the utter falsity of this theory.

CHATSWORTH GARDEN VASE.

THIS is a novel style of vase, designed and manufactured by Headly & Sons Cambridge. It is made entirely of wrought iron, and may be used for flower gardens as well as for conservatory or hall decoration. As here represented, there is ample variety of flower and foliage of the rarer as well as of the more common order, and we have only to shew the outlines of the vase to prove to suggestive flower decorators how they could, each with the material placed at their disposal, best dispose it so as the vase itself and its surroundings could each be improved or enhanced. Lined with zinc, or even with sphagnum, the mass of soil would be well kept together, and furnish sufficient food, with what was artificially supplied, to keep going the plant life introduced into the circumscribed home. While these vases could be filled with great variety, from Ferns upwards, the open sides might be utilized for plant-growth. Such a useful green as Selaginella denticulata presents, is cool and pleasing like, and the plant is as free-growing as it is possible for plant to be. Any one using it, in fact, as an edging alongside of the stone kerb of conservatory paths, can testify how well the plant will grow even under difficulties, and how much more satisfactory and better-looking, under scarcely any difficulty. These Mosses should be placed in good positions for light, and if they be attended to in respect

of moisture, this charming Club Moss will give every satisfaction. Even were this vase placed in a heated conservatory, along with a warm conservatory collection of plants growing, the interstices between the flat iron ribs would be quite the place for Panicum variegatum or Isolepis gracilis, hanging in wild ringlet-like profusion. We can, however, safely leave the disposition of all these things to the judgment and device of our lady readers, some of whom have shewn admirable taste in the arrangement of simple flowers and easily cultivated plants. To any who are in doubt, or who are in quest of information, we shall be glad to supply it. Many of our lady readers must be well up in the art of arrangement, and if one or other would put their experience before us, it would be all the more interesting and acceptable, particularly to the fair portion of our readers.



Chatsworth Garden Vase.

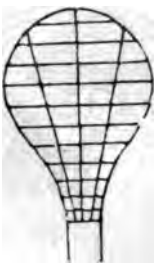
THE CAMBRIDGE COMFORTABLE.

WE have engraved so many chairs that our readers may be at a loss which is the best for them individually. All we can say is, that the Cambridge Comfortable is an admirable lounge, cheap to buy, and comfortable to sit in, particularly during the hot days we have lately experienced. The awning is a great additional attraction for people to buy, and the chair itself is so elastic that comfort is secured in every way conceivable for the system of mankind. The zinc covering on the ridge, which Messrs Headly provide, secures the awning, when drawn up, from wet, and is thus a capital conservative aid at a mere bagatelle of cost. To all who purchase, we say provide for this and no one need scarcely be advised in the matter, seeing that an odd half-crown secures the zinc cover. Such a seat would be particularly valuable about our public parks in the summer time, and about croquet grounds; so that those who do not take immediate part in the game may see and enjoy it in the cool shade.

The Cambridge Comfortable.

PETUNIA OR VERBENA TRELLIS.

PLANT trellises are often in demand, and more particularly by villa gardeners. We have named this one engraved, see fig., a Petunia or Verbena Trellis, not because it will suit no other kind of plant, but because of so many of these plants being grown by our constituents. This trellis is comparatively small, only fit for such climbing plants as we have named above, that grow in pots of from 6 to 8 inches in diameter. It is large enough, however, for the resources of many who wish to have "a little of everything" in their limited space. Although we have named this trellis as suitable for Verbenas, we prefer the flat style of growing these plants —that is, tieing the branches down to a table trellis. By so doing the flower umbels rise up in mass clear above the foliage, having the latter as a soft green cushion, as it were, to rest upon. On the other hand, by training them up this flat trellis, and keeping the front sunwards, the flowers all come frontwards, and, when well managed, make a pretty enough object. This form of trellis is undoubtedly the best of all for training Petunias. When these plants are well-grown they make excellent objects for greenhouse decoration. Grown in a moist mild atmosphere, with unlimited ventilation during good weather, the plants will remain in healthy condition, and send out flowers regularly disposed all over the face of the trellis. If the tints selected be showy, nothing will give a brighter, smarter aspect than a full trellised Petunia. Let villa gardeners all adopt this style. It would have been better to begin in time, but even yet with good healthy plants to draw upon, trellis them after this fashion, and grow them as near the glass as you possibly can. Some, indeed, for competition purposes, grow them in hot-bed frames somewhat cooled



Petunia or Verbena Trellis.

down, laying the plants on their back, and watering them the best way come-at-able. Then, after pinching any odd flower off during July and August, they allow the full quantity to expand in the show month of September, bringing the plants to the greenhouse to bloom out. Such is the *modus operandi* of such as possess the best grown and flowered specimens of these eligible summer decorative in-door plants.

NEW AND RARE PLANTS.

CYPRIPEDIUM FAIRIEANUM.

LADIES' Slippers are well-known and greatly admired plants. No matter whether the amateur grows Orchids in general, he is almost sure to be provided with a stove to cultivate one or more of the most interesting looking Cypripediums. The one which we engrave now, fig. 1, is one of the most charmingly beautiful of the family. It is somewhat ill to manage under the ordinary routine of culture; but if it be kept near the glass in moderate heat, and the atmosphere

be charged sufficiently with moisture in the growing season, it will reward the grower with flowers, more or less, according to the size and condition of the plant. It is somewhat subject to rust—a ferrugineous looking

Fig. 1.—Cypripedium Fairieanum.

coat that covers first the lower and afterwards the upper surface of the leaves. This infection is often generated in a too hot and a too dry atmosphere, with too little ventilation. The air must be circulated, and the moisture supplied as a preventative to the affection, and the more this is attended to, the better in health will the plant or plants become. It was first described by Dr Lindley, from a plant sent by Mr Fairie, of Liverpool, to an exhibition of the Horticultural Society of London in 1857, and again described and figured by Sir W. Hooker in the *Botanical Magazine* (tab. 5024).

It is a very beautiful species, approaching

C. insigne, but the flowers are smaller, are differently coloured, and have no warts on the involute sides of the lip. The dorsal sepal is pale greenish white, beautifully veined with

Fig. 2.—Dianthus Cincinnatus.

dark purple, and partially streaked with darker green; two inferior sepals united into one small ovate obtuse sepal, pale, with streaks of green and purple. Petals deflexed and curved like the horns of a buffalo, white, streaked with green and purple. Lip brownish green, with purple reticulations; sterile stamen, greenish purple and white, downy; between the horns of the crescent is a downy proboscis arising from the sterile stamen. Ovary dark purple, elongated, glandulose. Leaves oblong, strap-shaped, acute-green, rising directly from the root in a somewhat cæspitose manner. Flowers in October.

It appears that the plants described by Sir W. Hooker, as well as others, were obtained at a sale of East Indian Orchids sent from Assam. Many importations, since the date of its illustration in the *Botanical Magazine*, have come to hand.

DIANTHUS CINCINNATUS.

Among recent introductions, flower gardeners have hailed the various sorts of Japanese and other Pinks as among the most captivating. The subject of our engraving, fig. 2, is one of the type of the Heddewigii and laciniatus strain, and forms, accordingly, an excellent individual either for the decoration of the mixed flower border, or may be used equally effective for grouping. The flowers are of a rich claret colour, sometimes suffused with pink, and, from the tasselated form that the segments take, the flowers are most marked and distinct. The foliage is of ligulate character, smaller than we sometimes see D. Heddewigii to be; but the whole of the species, or rather the members of which it is composed, are of sportive character—sportive as to habit and formation of leaves, and equally sportive in the matter of flowers. We can scarcely dissociate D. cincinnatus from D. laciniatus, which is of the Chinese order, coming evidently towards the type of D. sinensis. Notwithstanding, the variety is a most eligible one. It was first brought into notice by M. Makoy, of Liege. When in good health, it flowers for three months of the season. The better way is to sow the seed in April, and transplant into nursery beds in May, finally planting out into prepared good tilth in early June, after which it soon flowers, beginning generally in July, and continuing on till late in September, provided autumn frosts do not check it. It is quite a choice border plant, and we commend all who have not grown it to note it as one of the eligible plants for summer decoration. It can be sown early in February, and grown in pots to flower in May; but by far the most satisfactory plan is to treat it as a half hardy annual, and use it as a beautiful subject for border decoration.

Work in the Garden during October.

From "THE VILLA GARDENER."

THE VINERY.

THE fruit ought to be fully ripe this month. If not, the chances are that it will not ripen at all. The sun from henceforth lacks the necessary energy to ripen the king of fruits. I ought to have cautioned the villa gardener last month against wasps and flies—the terrible pest of Grape growers in the autumnal months. Hardly is the fruit ripe till they are down upon them, the wasps mostly acting as sappers and miners for the flies. The former bore a hole, and the latter cluster around and drain the Grapes of their sweet juices, leaving the grower a series of scooped out skins. It used to be common to bag the bunches in muslin. But this is tedious work, and unless the bags are large, so as to stand clear of the berries all round, the wasps eat through the muslin and feast unseen inside. A much better way is to guard the openings with fly-proof haircloth, that admits the air, and keeps out every living thing. Mice and rats will now be sharp set, since the fields and orchards have become bare, and must be kept out or caught directly. They make sad havoc among ripe Grapes.

Should the Grapes not ripen kindly, or the wood fail to assume a nut brown hue, and a hardness approaching to bone, both must be helped to complete maturity by a dry atmosphere and fires. The latter to be employed rather during dull cold days than at nights. In dull foggy weather, light fires in the morning, and give air to prevent the fog entering or settling on to the Grapes.

Leave air on the vinery night and day. From the time the first speck of colour appears on the Grape till it reaches the dessert table, no condensed moisture should ever rest upon the bunch. Fire heat is one means of preventing this. A constant movement of air another. If, however, such excessive ventilation is given as to reduce the vinery below the temperature of the external air, moisture will instantly be condensed on the berries in consequence. The Vines will not require any water at the roots from this time till next season. In wet localities it is good practice to cover the roots with wooden shutters, tarpauling, or any other waterproof material, this month. This helps to mature both fruit and wood, and to keep the Grapes from rotting. Nothing contributes more powerfully to the decay of ripe fruit than glutting the roots with water at a time when the assimilating power of the plant is at its weakest. The leaves cannot elaborate the fluid sent forward by the roots; hence, an excess of water which rushes aside into the Grapes and rots them. Common sense, as well as science, tells us that if we wish our Grapes to hang, we must keep the water out. Any excess of foliage may likewise be removed, so that light and air may play freely all around and among the bunches.

Again, look carefully over the bunches every second day, and cut off, or out, any specked berry. If there is any difference in the bunches, use those on which the berries have been left the thickest first. The looser the bunch hangs, the longer the berries will keep, for mere mechanical reasons. Undue pressure not only causes decomposition, but necessarily hastens it.

Finally, cut your Grapes in the early morning, that they may come to table cool, free from the flavour of stale sunbeams.

THE ORCHARD HOUSE.

Keep the orchard house cool and dry. As soon, however, as the fruit is safely gathered, the roots may be well watered with sewage if the tree requires it. If planted out, and the leaves keep green, and the wood growing, no water may be needed. But if the leaves droop and the young wood shew signs of distress, water the trees, as above, as a means of strengthening them. When the trees are grown in pots, and the roots have been allowed to run through, the pots are mostly lifted this month, and the roots beyond them are broken off. Within a week or so of this radical mode of root pruning, remove all the worn-out soil to a depth of from 4 to 6 inches from the surface, and replace it with nice turfy loam, or one half loam, one half well-rotted dung. The vertical roots being thus suddenly removed, the plants hasten to emit horizontal and surface ones, and finding good stuff to run in, the trees are soon recouped for their loss of their deeper, stronger roots. There is, however, considerable danger in this operation. If done too soon the wood will shrivel, and the flower buds refuse to plump up to fruitfulness. If deprived of too many roots, the flower buds will drop off the following spring. The success of this rough-and-ready mode of root pruning depends very much upon the numbers and state of the roots remaining within the pots. If these are sufficient to bear the loss of the other, increased fertility will be the result. If not, weakness, disease,

it may be, it often as been, death, result from tearing the roots off in this wholesale manner. Better far either grow the trees in pots or not. If the former, keep the root from running through by frequent removals or a hard bottom. The mere fact of growing in pots is check sufficient to turn the tree fruitwards. If not, keep it dry; water with clean water in lieu of foul, or take a heavy crop. Starvation or overwork will teach the tree fertile habits, and it is easy to strengthen it to bear its fruitful burdens with liquid food.

On no account should trees in pots be wintered in the open—at least not stone-fruits. The abnormally developed buds are perfect god-sends to the pinched, hungry birds, and when you proceed to house your trees you will find them bare boughs, indeed, with never a fruit bud left. Besides, trees grown under glass become tender and unfit to do battle unprotected with the elements. The idea that cold or frost can ripen wood has long been shelved, among a host of other popular errors horticultural. It may rend, rive, ruin, wood, and clear off bushels of imperfectly matured buds; but as to finishing any process of growth, as well ask the lightning to finish the work of the sun. Keep your fruit trees under glass, and if room is wanted for other plants on the floor of the orchard house, place them among the fruit trees, or pack the trees closely together, and form groups of hardy flowering plants, such as Chrysanthemums, or beds of useful vegetables, such as Walcheren Brocoli and Lettuces at one end.

THE GLASS HOUSE.

As the cold finger of winter begins to be laid on outside beauties, more care should be taken to preserve and multiply those under glass. Hence, as the days shorten, more attention should be bestowed upon the glass house. One great object of having a glass house is to provide flowers of different kinds inside from those that will bloom out-of-doors. But the chief use of glass is to furnish flowers when few or none can be gathered beyond its sheltering wing. In harmony with this dual object, the house may have been largely filled with semi-stove or tender plants, such as Achimenes, Balsams, Gloxinias, Begonias, Ferns, Palms, &c. These must now give place to the more permanent occupants of the glass house. There must be a clearing out and bringing in. Tender plants should be removed to the hot pits to finish their growth. And such things as Lilies, late Fuchsias, Pelargoniums, that have exhausted themselves, may be placed out-of-doors till the frost comes, or in a cool shed, orchard house, or frost-proof room. Climbers may also be cut in, and a general cleaning of roof, stage, shelves, floor, take place. This general clearing up is preparatory to the new tenants. Azaleas, Camellias, Heaths, Epacris, and all hard-wooded plants, should be safely housed before the end of the month. It is often a marvellous transformation—by no means for the better. The dying glow of summer glories is succeeded by a house of green. Therefore it shews good management if some choice variegated and plain Pelargoniums have been made to flower late, that they may fringe the greenhouse in early autumn with their bright and cheery blossoms. Chinese Primroses should likewise be now shewing their hope inspiring flowers.

Where one glass house, however, has to receive all tender plants, it must perforce look verdant now. French, show and fancy Pelargoniums, to say nothing of the exhausted stock of Zonals, silver and golden tricolours that have flowered so gloriously through the early autumn, must all be provided for, while every nook and cranny is filled to suffocation with bedding stuff. Under such high pressure conditions, the glass house, at the end of October, looks like some of those old fashioned band boxes, into which were squeezed entire wardrobes, and occasionally some useful articles of household furniture, to boot. It is almost as difficult to carry such crowded houses through the winter as to take an over-freighted vessel across the Atlantic. And if the glass house must receive all our plants, we will be better off for plants next spring if we have a massacre of the innocents at once, than allow the elements to carry similar work on at their leisure, all through the winter. Only a little, and the best of each variety, should be our motto. And we must see that each plant housed is clean, and clean all over and all through, not only the plant itself, but its pot and surface soil. Dirt and overcrowding are the foes that slay plants by the thousand during winter. For one that surrenders to the cold, these destroy hundreds. After housing the plants, let them feel as much like being out-of-doors as possible. Unless frost or very high winds occur, leave sashes, doors, and lights, open night and day for a time, so that the change from the outside to the inside, may hardly be felt at all. I have seen plants taken in and done for thus; shut up closely at once, no air given till the sun had perhaps run the glass house up to 70 deg.

Soft wooded plants started into growth to rot in November fogs, and Camellia buds loosened by the sudden excitement, and scattered over the floor of the house, like dishes of huge green peas. Great care is needed in watering moderately after housing plants. Some, such as Camellias, must be watered freely, or the buds may be injured. The foliage should likewise be sprinkled over in bright weather, so that the plants may not miss being all at once deprived of the copious autumnal dews. Such plants as Pelargoniums, again, must be kept rather dry: the object now is to slow, sturdy, firm, not rapid and sappy growth. Of course, no frost must come nigh the house. Let 40 deg. be the minimum, and 50 deg. the maximum of fire heat. With abundance of air, the external temperature, whatever it may be above that, will neither weaken nor draw the plants.

PITS AND FRAMES.

' *Pits.*—Apply linings of hot dung to finish late of Melons. A temperature of from 70 to 80 nust be kept up. See that the glass is clean, so very ray of light gets freely to the fruit. With- ıore care and skill than most villa gardeners ss, no more Melons worth eating will be got out :s or frames this season. Cover the glass at with a double mat.

:umbers.—There is more hope of these, and I known amateurs succeed in cutting a supply all inter. Strong young plants of the Sion House aster's Prolific are sometimes planted in fresh :his month, and by a weekly renewal of linings, a supply is kept up. The great difficulty is ; the chief danger, an excess of water in the and the air. The cold is easily kept out by ıgs, and the heat sent in by linings. Where : Cucumbers are attempted, it is best to grow on a trellis free of the soil, and within 1 foot of

onias, Gloxinias, Caladiums, may be kept here dry state. Thousands of bulbs are lost by pting to winter them dry in a low temperature. not be done. Keep them warm when dormant, ou will find them all right next spring. These ts will be in immediate request for bringing on early flowers, such as Lily of the Valley, nths, Roses, Lilacs, Deutzias, &c. Therefore, ıin a bottom and top heat of about 60 to 70 deg., handy place will always be at hand for rooting ıoice cuttings, bringing up any rare seeds, and ing forward any desired flower, fruit, or vege-

l Pits.—Some villa gardeners will now fill these :hrysanthemums, and if the flowers are expected t, the plants should not once be frozen. Most em for storing bedding plants, Pinks, Car- s, Auriculas, Brompton Stocks, Mignonette, s, Cinerarias, Calceolarias, &c. These can be kept too cool, if only they are preserved en. Pull the light off in mild weather, and hem off even at night if you can be sure of it. carefully if frost comes. Water enough to keep

Beware of mice and rats especially if bulbs are in the pits. Remove a few of the earliest pots ıs to the warm pits.

THE FLOWER GARDEN.

ıh the propagation of all bedding plants, wind- with Verbenas, Ageratums, and Calceolarias. ly the small side shoots of such for cuttings, ıot in a cool close frame or pit, with very eat. Heliotropes, Petunias, Coleus, Iresine, ill root quicker in a higher temperature. But ient stock has not been provided, not a day be lost, and most of these tender things keep ıen thoroughly established before winter. All young bedding plants should be safely stowed in thei winter quarters before the end of the month.

Having thus provided for the future, our next duty is to care for and enjoy the present. The flowers often continue in great beauty throughout this month. While the frost lingers, be it ours to enjoy beauty, and remove every speck of decay in leaf and flower. The great secret of perpetual blooming is constant picking. It is seedbearing that exhausts plants. Off with the seed before it has time to drain out vital force, and flower succeeds flower for ever. And off with dead and dying leaves likewise. They can do more work, and it is bad taste to strew our fields of beauty, like fields of battle, with our dead workers. Away with them, to make room for others, and to roll back the advancing tide of death and decay as long as we can. Every week of beauty now is so much lingering summer wrested from the cold grip of winter, and should be valued accordingly. By autumn care, and spring preparation, we shorten winter at both ends, and make its bleak reign over our gardens as short as possible. Autumn tide has likewise a beauty all its own. The short days and long nights bring out the softest tints to perfection, and the garden prepares itself for a sacrifice to the frost, as a bride adorneth herself for her husband.

Seed Saving.—See to anything choice at once. Asters, Marigolds, Zinnias, &c., may be gathered in flower and dried, the seed will be found ripe. This is a fact worth knowing, as, if gathered in flower, the best will assuredly be collected. Dahlias, Marvel of Peru, and Gladiolus, may be taken up and housed. But there is no great hurry. Dahlias often go on flowering gloriously during this month. And we seldom have first frosts sharp enough to injure them with their tops on. After they are cut down, they should never be left in the open a single day. Many have to clear away much autumn beauty to prepare for a winter or early spring display. But a compromise might often be effected thus:—Plant bulbs thickly in boxes or borders to root, and remove them to their final quarters after the flower garden is cleared. Bulbs are hardly injured by removal in a chipped or growing condition.

Then as to all the other materials for spring gardening, the Forget-me-nots, Violets, Aubrietias, Daisies, Arabis, &c., it matters little when they are moved—from October to January—if it is done with care and judgment. See that the plants are strong, freely rooted, and well set with flower buds, and then move them with balls at your leisure, and they will never look back to ask what month it is.

Hardy Annuals, such as Nemophila, Saponaria, Clarkias, &c., may yet be sown, and those sown in August for winter blooming, pricked out into beds preparatory to final planting in flower beds or borders.

Keep the grass short, the walks clean and bright, destroy all weeds, so that no dirt, nor robbers, nor slovenly keeping, should invite winter to make a

sudden raid on our summer beauties in the flower garden.

THE FRUIT GARDEN.

Gather fruit as it ripens, carefully, without bruising it either with hand or by transit. It is mostly light work the gathering this year, therefore more time may be devoted to it. A good many Apples and Pears seem to ripen prematurely. These neither reach full size, nor have their full flavour. All such should be stored by themselves, and used at once. They will not keep, and will be found eaten by grubs, or malformed within. Some varieties are unusually late. Let such hang till they are ripe. Unripe Apples and Pears turn out most unsatisfactory. They eat hard and leathery, instead of sharp, crisp, and full of juice. Begin with the ripest, and if one or two is ripe, gather that without waiting for others. Some fruit growers harvest their fruit on the same principles that Aunt Chloe "clared up de kitchen." They have a certain time for it, and it must be done then, fit or unfit. Once they begin, they must also go on to the end of it, ripe or unripe. This is a great mistake. Better lose a few fruits by wasps or other vermin, than store it in such a state as to lower the quality of all.

Late *Peaches*, *Plums*, *Cherries*, &c., should be protected with fly-proof canvas or haircloth. Flies and wasps are very plentiful, and have skeletonized all the small fruits with a rush—they are now swarming on the walls. The best trap is a hollow mouthed glass bottle, with a funnel-like entrance in the centre of the wide top. Fill these with beer and sugar. There is a broad entrance, and no return. We have bottled pecks during the past six weeks. In two days the bottles are full of blue-bottle flies, wasps, hornets, butterflies, moths. Root prune all trees that need it. No tree that fruits freely should be root pruned. In all such matters leave well alone. One crop of fruit is the best possible preparation for a second, and so on for ever. But if any tree is persistently barren, then prune its roots. But never cut more than one half at a time, and this makes its fruit swell; if not, cut the other half. Many fruit trees have been crippled, ruined for life, killed, by reckless root-pruning. All surgical operations need skill and care. We are careful as to whom we allow to operate on our limbs, but our trees are entrusted to any one to hack and hew at.

Strawberries, *Raspberries*, &c.—See last month.

As soon as the leaves fall, partially unnail *Peach* and *Nectarine* trees, and commence at once to prune and nail *Cherries* and *Plums*. One man will do as much nailing on a mild autumn day as three in a biting spring wind. Yes, and the one will do it better. Drive all possible work forward now, such as preparing ground for the planting of fruit trees and bushes, the collecting of soil for fruit-tree borders, &c., else the work will drive you all through the year 1872.

THE KITCHEN GARDEN.

Harvest all root crops, such as *Potatoes*, *Parsnips*, *Carrots*, *Beet*, *Celery*.—Water, if dry, previous to earthing up successional crops of Celery. Cabbages hoe among, and lightly earth up. Plant out some more of the strongest plants.

Cauliflower, *Walcheren Brocoli*.—Plant out under hand lights, protectors, and in the open ground, to stand the winter. Look over late crops, cut and store safely daily.

Plant out *Letttuces*. Blanch *Endive*, and store in pits or cellars Lettuces ready for use.

Hoe and thin late *Turnips*, *Winter Spinach*.

Stir the ground among *Lettuces*, *Endive*, and *Walcheren Brocoli*.

Manure, dig, and trench all the ground vacated by autumnal crops. See that every inch of ground is either under crop or fully exposed in a rough and raw fresh dug state to the ameliorating influences of the atmosphere. Allow no weeds to fatten on, and thus impoverish the garden. Make new walks, or mend and fresh-surface the old ones; remove all dead and dying vegetables, and let neatness and order be the rule throughout the vegetable department in the dead season.

The Veterinarian.

IMPROPER SHOEING OF HORSES.

EFFECTS ON THE FORM AND CONDITION OF THE LEGS.

THE evils of modern systems of shoeing are many, and to their influence we may trace one-half of the deterioration of horses—the other being brought about by want of proper care in work and management. In our last, we pointed out the result of over-work as demonstrated in its effect on the muscular structures, causing knuckling or bending of the legs. We have now to consider another cause arising from shoeing as commonly practised.

At the outset, we must direct attention to certain animals which are used in slow work, as a rule—farm horses and others, the feet of which, not being regularly shod and subjected so frequently to the action of the knife and rasp of the smith. These maintain, as a rule, good strong, large, and sound feet, and their legs continue to advanced age straight and fine to a remarkable extent. But, on the other hand, take such animals away, and, although removing them to some large town, they shall continue to perform the same kind and extent of work, their legs soon begin to exhibit signs of degeneracy and malformation. Tradition, which always finds a cause for everything, has irrevocably stamped the blame on the stones. The hard stones, say our wise men, are the cause of *concussion*, which, being communicated to the foot, is continued upwards and shakes the limbs, and here the concatenation and sequence of changes are suddenly stopped, and inquirers are left to grope their way as best they can to the as far distant solution. Such descriptions never fail to mix up several causes, and, in the cases before us, we have the results of careless and excessive driving, prolonged hard work, too little rest, defective stable floors, heavy shoes, and a host of influences, which exert in combination irretrievable results. In a well formed limb there are to be observed some of the most admirable contrivances of nature to *obviate* concussion, and when allowed to exercise her functions, most perfectly and beautifully does she accomplish them. The legs possess numerous bones placed at convenient angles with each other, and, united by tendons in a most appropriate manner, admit of extensive motion. The fact that angles are chosen for some essential purpose, must be obvious to every one who examines the limbs. Had they been straight columns, with few or no points, the question of concussion as a result of a moderate jump, and even during a walk or trot, might be seriously maintained. But see the dipping fetlocks of the thoroughbred, each time the weight of the body comes upon the limb. Is this not conferred for some wise purpose? To avoid concussion, most assuredly. Besides, the muscles above are richly endowed with nerves, sensitive telegraph wires, in constant communication with the great central station—the brain, which, being timely warned through its connexion with the eye, receive such signals during rapid movements, as enable them to place the limbs and feet securely on the ground. A straight column of bones would require no such organization of departments, and a wooden limb would answer every purpose.

But in addition to the wonderful powers of co-ordination just enumerated, we find the foot is covered with a strong horny box, capable of maintaining its own integrity, by efficient growth; and, at its base, which, as a

necessity, must reach the ground first, we find a triangular, or wedge-shaped elastic cushion —the frog, so named, and a most wonderful adaptation it is also for the ends desired. The frog first receives pressure, or concussion if the term must be retained, and neutralizes it so completely that very little is conveyed beyond to other parts. But were it otherwise, the form of the limbs, with the springy action conferred upon them, would totally absorb it. It will be understood these remarks apply to healthy and perfectly formed feet and limbs.

We now examine the reverse of these states, as produced by the smith. The whole art of shoeing, as generally practised, consists of paring away the foot *to fit the shoe*, and afterwards rasping the outside, to please a morbid fancy. The frog, nature's elastic cushion, is also removed; shoes are lost in consequence of the foot being reduced, the nails used often being too large, and splitting off portions, alternate effects of dryness and moisture, and unnatural drying in consequence of unnatural reduction, limits the nutrition of the hoof. Such a foot becomes thin, weak, and shelly; and the smith, to hide his ignorance, recommends bar shoes, leather soles, and stopping, a run at grass, and so forth. Sometimes he asserts the animal has *naturally* a shelly foot: and the owner has no alternative but to believe him.

In addition, the shoes are provided with clips—portions turned up on each side as well as front, and these the farrier hammers tightly into the hoof, thus compressing it very tightly. A heavy hammer is also used, and the creature winces, and becomes troublesome to shoe, for which he, not uncommonly, is severely beaten.

All these culminate in injury to the legs. First, we have the want of protection to the bones of the foot within the hoof; they suffer and become inflamed, and at the parts where pressure is greatest, lose substance by absorption. The animal becomes stilty, and is said to be groggy; "he goes like a cat on a hot plate," and well he may. The evils are, however, still perpetrated by Mr Farrier, and not knowing how to remedy them, probably tries all the absurd patent shoes which cunning men have devised as a "good draw," and the owner finds himself obliged at last to sell his favourite, disease having extended from the foot upwards, the whole limb to the knee being involved, and the animal's condition disgracefully sacrificed by an amount of torture which the perpetrator alone should be made to suffer for one week in order to bring him to his senses.

We are reminded of "humane shoes," patent sole cushions, and even patent frogs, for horses' feet—the inventors claiming merit for devices to obviate difficulties which are incessantly brought about by ignorance and brutality, while a sensible glance at Nature's laws would convince them, if let alone, she can supply better contrivances without any of their assistance, and maintain more perfect feet and limbs and a life of prolonged usefulness, now denied by him who professes to superintend her conservation and prosperity—*G.*

*RATIONAL TREATMENT OF HORSES.**

HIS is rather a curious volume, and may usefully occupy a niche in the amateur's library, in order to convey ea how pages, from title to colophon, ɔe covered. Part first is devoted to a ɔing denunciation of the "unnatural ɔarbarous treatment he (the horse) has ved for many generations." A sub-on of part first is devoted to an idgment of, and deductions from, ıamphlet on the rational treatment of s," &c.; and part second is com-l of a series of letters, addressed by the ır to various exalted personages, upon ı he has endeavoured to press his view ɜ necessity for reform in horse manage-

The abridgment of part first may ghtly viewed as a criticism by the author ɜ previous part—a favourable review, in ɔf his own work, rendered, we opine, ıs a man is entitled to write his bio-ıy. Whatever may be the extent of irony comprised in the context of part it is in nowise allowed to decline in ɜcond. Throughout, there is an evident for some one, and after wading through s of natural history, anatomy, physio- &c., with a glance at medical thermo-cy, mainly by means of unsupported ion, the butt of the whole appears to rtain public bodies and individuals, who failed to see the charm of "Amateur's" sion, and results of his lengthened study experience. In his mind, the truth of phorism—

"The pen is mightier than the sword,"

fectly realized, and, in acrimony intense, ıarties alluded to are severely criticised. ımateur" complains that his letters not been noticed by gentlemen to whom they were sent, they have not deigned a reply, nor thought his reform in horse management worthy of notice, still less adoption. As he *naively* says, at page 37, part 2, "One man may take a horse to water, but fifty can't make him drink." So we would remind him that one man may write a book, but he cannot make, or even expect that every one will even read it, still less become a convert to his theorems and pet ideas, which he has embodied therein.

With "Amateur," no sin appears to be so great as to leave his book unnoticed. We will therefore give our quiet judgment of its merits. We have said the book is a curiosity, it is a marvel of assertion and irregular production. Part first, price 6s., bears the date of *anno domini*, "1871," while the sub-division of the same, together with part second, price 6d. and 2s. 6d. respectively, date their birth from 1870, and in the context of several of the letters which appear in the latter, "Amateur" states his work was published four years before that time (1869). "Amateur" has evidently not arrived at that period in the history of book-making which tells of subsequent editions, revised and corrected, &c. A stock of pamphlets, having a post date affixed to preface, do not submit with grace to the addition of new title pages, with various dates to the present, and put into juxta-position. To do duty as a legitimate whole, mature thought may render the indiscretion following of such a step more apparent.

In the animadversions so plentifully heaped upon the racing fraternity, as well as horsey public, for its conceit, dogmatism, and apathy to the preaching of reformers such as "Amateur," we fear there is too much truth. Yet a man may do as he pleases with his own, and in this mood the owner of all quadrupeds, from the Indian Nawab, with his elephants, to the boy merchant in lop-eared rodents, each has his special doctrine

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*lorses: their Rational Treatment, Causes of Deterioration and Premature Decay. In Two By AMATEUR. London: Ballière, Tindall,

and discipline. Many have struck out for themselves in the great path of reform by-ways and sub-ways, but none have succeeded so well as those whose modesty and gentleness were the steps by which truth is brought to the surface. "Amateur" does not appear to possess these attributes in excess, as will be distinguished by the careful reader who desires information regarding his system. At page 14, part first, "Amateur" furnishes the following unhappy statement after a quotation from the work of Mr Winter:—"The intricate nasal formation thus described [the turbinated bones and nasal chambers], is the seat of that incurable and fatal disease called glanders, to which the horse, on account of his peculiar conformation, appears to be liable, and to which so many have fallen victims, one of the evil results of the unnatural and barbarous treatment to which man, through ignorance, vanity, and avarice, has subjected this noble animal." We have yet to be assured that glanders has its seat only in the nasal organs. If it were but a local disease, as "Amateur" confidently makes out, wherein consists its fatality? What a blessing to the human race if his statement were correct; but experience, the sheet anchor of "Amateur" in horse management reform, has evidently deserted him here, and he has given us the local manifestation of a constitutional disease, having mistaken a sign for the malady itself.

On the question of fever, also, "Amateur" exhibits the absence of correct knowledge. He stated (page 20, part 1):—"We lay it down as an axiom:—that blood heat being, having always been, and still being, at 98 [?], any horse whose blood is nearest that heat will beat in the distance any horse who has more heated blood." At page 30, the axiom is repeated, and with it appears:—"This an important axiom, and we have never seen it laid down or explained." At page 31:—"We are satisfied that all the caloric or matter of heat necessary for retaining the temperature of blood at 98, ought to be imbibed from the atmosphere, through the lungs only:—and that if it come from another source, which we shall shew that it will do on the slightest departure from health, an increase of temperature above 98 takes place, and an alteration of structure opposed to a state of health commences. This alteration we define to be the commencement of fever, or inflammation, plethora, and disease." "Amateur" has forgotten to inform us whether he has adopted a new arrangement for estimating the temperature of the blood, or if he has made use of the scales of Fahrenheit or Reaumur, and, evidently at sea again, blunders over the question of blood heat, as if no range whatever had been assigned to it. What will he say to the fact that thermometricy in relation to health and disease has long since—before the appearance of his pamphlet—declared that animal heat of the horse has a fixed range in health from 98 deg. to 102 deg., and that food effects as great an alteration upon it as exercise? In his enigmatical sentence just quoted, he would have us believe that a horse should live on air alone, but we opine he would find in it a poor agent for the development of animal heat and muscle.

But from blunder to blunder appear the steps of "Amateur" to be bent. At page 36, he appears to fortify himself on the question of the physiology of digestion, and delivers the following startling announcement:—"It is true that his [the horse's] dung is richer than that of ruminants," and he attributes the cause to be due to a want of proper food, the stomach being unable to extract the nutriment of (his so-called) unnatural aliment, as dried grasses and hard grain. Horses, he believes, secrete in their stomach more gastric juice, and hence "the excrements are more animalized, and therefore richer." We beg "Amateur" will excuse our obtuseness, but we fail to understand such logic. He professes to give us his truthful experience of the causes of such a phenonemon as the difference in the quality of the fæces of two animals diametrically opposite in nature, uses, habits, and mode of living. Will he have the goodness to enlighten us on the relative qualities of the same matter from one of the horses fed on grasses, with little or no substitute for corn, as he proposes in his second part? It is quite as scientific

ɔgical in argument to advance such ents, as it would be to compare the ısition of the dung and urine of an ele- and one of the higher carnivora.

nging deeper into the mysteries imal physiology, he says:—"Cloth- hrows the heat, which would other- be more apparent in the skin, in- ly, or to the legs; and bandages on the f animals in such a state, again, more ally." Acting on such theory—for it is ıe experience of "Amateur" we think— commend all sick persons who retire to beds after gruel and nitre for the pur- of courting perspiration, *not* to use clothing for the reasons stated by the r, and to look to him for the substitute ı he has not given; perhaps he would ımend a wet sheet or a pail of cold thrown over the animal.

page 59, he asserts that horses "have made for generations bankrupt in ı," and while "the rational treatment" can prevent such an untoward event imals properly selected and constitution- ound, "to return to a state of health now become a work of time and ıce;" in short, "having obtained healthy ts developed in their muscular sys- (and from experience we state it can be nplished), their produce will be naturally l and healthy, capable of living in a ıal way, without any retrograde move- , attended with uncertainty as to its ."

ıus endeth his first part. "The rational nent" (which he says he has already ined, but instead of which he has in- d in pulling other people and their ons to pieces), is advanced as the pre- ve of that degeneracy or deterioration t which he has contended for the horse Admiral Rous and the Jockey Club, rs Weatherby, &c.; but ignominiously by recommending a proper selection of ıts—a fact which many others have tained to be the real necessity, coupled judicious work or exercise until mature It is not merely a question of food as "Amateur" supposes, but one of science and mature wisdom, which gamblers have found commercially unprofitable. We do not admire the racing fraternity, as a whole, much more than "Amateur," but we see no reason to provoke a quarrel with them, and therefore pass over the account of his squabble as recorded in the appendices A and B, as well as the "review" following, and conclude with a notice of part second.

This, we said before, consists of a series of letters — "rejected addresses" — sent to various personages connected with Government, who, in major part, were deaf to his entreaties.

In letter No. 2 is detailed "the practical part" of "Amateur's" management, which we give in his own words, as forwarded to Sir James Scarlett:—

Green food from April to October, if in the stable, in limited supply; if at grass, the horse to be put on short pasture, so that he could not get fat. Hay and straw, chaff and carrots, from October till Christmas, or as long as carrots can be procured. An iron manger three parts full of chaff, and the carrots given whole on the chaff, to be fed four times a-day.

Hay and straw chaff in same quantity wetted, and ½ pint of meal (barley, beans, or oats), and ½ pint of bran stirred in. To be fed four times a-day. This diet from the time carrots or roots cease until grass comes again; in consequence of the season, it is now wholly artificial. No rack hay allowed at any time, but a limited supply as straw as fodder. Alteratives frequently, which experience and the state of the skin indicate. The horses to be in loose boxes, communicating, so as to keep their stable sufficiently warm, to prevent water from freezing when shut up at night. No clothing to be used, but as much open air as possible, when not too cold. If the weather is cold, and the horse much confined to the stable, bandages to the legs answer better the purpose of keeping him from being chilly than any clothing. Mature horses in full work, a similar treatment; but they will bear the artificial food of grain and dry grasses for a longer period with less detriment than the young horses; but all horses, young or mature, are more or less fevered by artificial food.

The horses' beds to be littered with sawdust or tan, refuse straw, dry leaves, sand, or anything suitable to keep them from the pitching stones or bricks.

No unpleasant smell will arise from the dung or urine of horses fed as above.

Water in constant supply, so that the horse may get it whenever his nature requires it. It will be found that he will drink in less quantity at a time,

and less water, on an average, than when supplied with water at intervals.

. . . . . .

I do not think this regimen would exceed in cost 3s. per week on an average.

The manure is valuable, and forms a deduction from the cost of keep.

After this category of rules, we require to know how the draught and business horses in large towns are to be kept, in the total absence of pasturage and carrots. What is the size of the iron manger advocated? Does it hold a peck, a bushel, or more? What are the rules about alteratives? Many persons use them *according to experience*, and kill their horses. As to the absence of smell from the dung and urine, we quite agree with "Amateur;" where there is no flame, there is no fire. In the first part of his pamphlet, he condemns the use of artificial (?) food *in toto*, but yet he cannot do without it after all.

We have only two other conclusions to draw. If the urine and dung of such horses do not smell, the manure is *not* valuable. The cost of such keep is too much for the amount of nutritious elements it gives, and we would prefer never to ride or drive such a shaggy, soft, and washey animal as our friend's treatment produces. There are scores of penurious old men and farmers who practise such an absurb system, and their animals' condition have attracted the ready attention of our respected friend Mr Colam, the Secretary of the Royal Society for the Prevention of Cruelty to Dumb Creatures. We do not feel surprised at Sir James Scarlett returning for reply, his advice to "amateur," to first try his treatment on the horses of his friends, and see how they like it. "I write," says our author, "to you only as an amateur," yet enforces his anxioms as a competent authority to science bred. His dogmatism is positively opposed to the plan of conveying information. Horse-owners, the public generally, the Jockey Club, &c., are visited with acrimonious and sweeping denunciations. The racing fraternity are "foremost in the ranks of enemies to culture," and the veterinary profession is hurled into the same category. At length, part second is concluded, and with it our notice, and two conclusions are irresistibly enforced upon us:—one, that the real object in attempting to point out reform in the rational treatment of the horse, has been to obtain an opportunity and suitable vehicle for the conveyance of expressions of private feelings of animosity against certain bodies and persons with whom, more or less, the author is unfriendly; the second is, a consciousness that in reading the book so much time has been wasted, and disappointment created. When, after reading our author's blunders in philosophy, he charges a useful profession, who "profess science and err in its first principles," we are reminded of the proverb which says something about glass houses, and the quarrel of the pots and kettles fitly suggests itself as a simile of his *contre temps* with the racing elements.

DISEASES OF THE RUMEN OR PAUNCH.

THE rumen, although not possessed of any great degree of sensibility, is nevertheless liable to many disorders. A peculiar and not uncommon occurrence is to find indigestible and foreign substances lodged within that compartment. Every practitioner meets with cases frequently, and many are recorded to shew the number and variety of substances that are occasionally found therein. In the Veterinary Museum at Alford, there is a calculus that was taken from the rumen of an ox, the nucleus of which proved to be a woman's neckerchief, without one laceration in it. In other cases are found pieces of leather, iron, nails, and many such articles too numerous to mention, shew-

ing that the cow is a very greedy animal, and frequently devours very strange materials.

The presence of foreign substances in the rumen to any great extent soon produces a considerable amount of local irritation, and, as a result, the proper function of the stomach is impaired. When these substances present a sharp point, they may penetrate the walls of the stomach and also the abdominal walls, giving rise to great pain and suffering, and now and again a foreign substance is found within the pericardium or covering of the heart, having made its way from the rumen and penetrating diaphragm.

It is a difficult matter to diagnose the presence of these irritants, but they may be suspected when the symptoms are of a chronic character; the animal falls off in condition, and has an unthrifty appearance, and is liable to slight attacks of tympanitis. Medical skill in such cases is of little avail, as little relief can be given.

TYMPANITIS.

The most frequent complaint of the rumen is tympanitis, or hoven, or distension from gas, which is produced from the substances taken undergoing the process of fermentation. This severe and alarming affection may primarily proceed from various causes. It may appear as a sequel of choking, or from chronic indigestion, a constipated state of the bowels, or as an accompaniment of parturient fever; or it may be associated with chronic disease of the liver or of the lungs. But the most frequent cause is a sudden change of food; for when an animal is taken from poor or less nutritive food, and put upon a rich succulent diet, such as clover and turnips, and it generally eats so greedily and so largely that the rumen ceases to act, the food does not circulate through its cavities, and from the combined action of heat and moisture, gas is extracted from the fermentation of its contents. During the autumn and winter months it is occasionally brought on by injudiciously giving either frosted turnips or potatoes.

The symptoms of hoven are of a very alarming and distressing nature; the paunch is blown up like a bladder, distending the left flank, which will stand prominent above the backbone. When tapped with the hand, a resonant sound is produced; the poor animal suffers intense agony; the breathing is increased almost to suffocation, caused by the distended parts compressing the lungs; he moans heavily, and evinces pain by striking his belly with his feet; the brain becomes affected; he has a stupid look, and will stagger round for a little, and then fall violently; and death may take place either from rupture of the rumen, or of the diaphragm, or from asphyxia.

In order to save the animal, the first object to be accomplished is to liberate the gas, and the measures that may be taken for this end must be regulated according to the severity of the attack. It may be got rid of by giving a good dose of turpentine and raw linseed oil, in the proportion of 2 ounces of the former to 1 pint of the latter, or the preparations of ammonia may be used instead. When the symptoms are deadly severe, recourse must be had at once to puncturing the rumen, which is best done by a trochar and canula, which every farmer should have in his possession. The operation, in case of necessity, may be performed with a common pocket knife. The place to puncture is the left flank, about equal distances from the last rib, the backbone, and the point of the haunch. Make an incision through the skin, and then insert the trochar and canula, and withdraw the trochar and allow the canula to remain. The gas will rush out with great force, and give immediate relief. After your object is obtained in the liberation of the gas, remove the canula, and apply to the wound daily a little cold water. A mild laxative should also be given, such as a pint to a quart of linseed oil, or 6 or 8 ounces of Epsom salts, and the food given for some time must be such as is easy of digestion.

This fatal disease might often be prevented by exercising a little care and attention when it is necessary to change the food. —*Toronto Globe.*

SIDEBONES IN HORSES.

THERE is much to be advanced in reference to the hereditary nature of sidebones. As an item in the lengthy list of points to be avoided in the selection of animals for breeding, they form one of the most important, and by such observance, in a great measure, their occurrence would be much less frequent.

We now purpose to consider the common and exciting causes of sidebones, avoiding the arguments and speculation in reference to hereditary question for a more convenient opportunity. In a previous article, we cite the facts and conditions which confer upon the limbs of the horse the wonderful powers of adapting themselves under trying circumstances and rapid movements. They are perfect in health, but by man's interference and carelessness, as well as brutality sometimes, those powers are subverted or perverted. We remarked, in addition, that the hoof estimated and preserved as nature had originally designed it—a protection and support—the communication of jar, or concussion, is impossible; but cut and rasp it away, and it then ceases to support and protect. The sensitive parts are brought nearer to the ground, and pressure from stones, the shoe, nails, &c., operate very forcibly. The circulation is altogether interfered with, and a proneness to inflammation ensured. Parts hitherto united, and preserving relationship in the performance of functions, are now disturbed by the institution of motion between them, and pain results. Thus, when the heels are lowered too much, and the frog pared or neatly dressed up, the wings of the coffin bone, which are prolonged backwards by means of cartilage, to mitigate or absorb concussion, receive an unnatural amount of pressure, and are caused to undergo needless motion. They then become, first, simply irritated, and tenderness merely is present; but this increases as the case is prolonged in its application, and becomes pain and inflammation. The sound, strong, healthy foot, would either prevent these states, or, in the case of hereditary predisposition, delay their appearance for a much longer time; but being reduced to a condition inadequate for its purposes—even the weight of the animal standing induces disease—it recedes and assumes an alteration of form, to the detriment of the parts within. As cartilage, like all other parts of the body, cannot have inflammatory action going on within its substance without undergoing change of structure, that which prolongs the coffin bone into the angles of the heels being no exception when so affected, eventually becomes bone. It will be now readily understood, that such a change being secured, the former elasticity will be gone; the rough surface of bones which now come together, do not favour ease of motion. Stiffness is the consequence, and not uncommonly the point is permanently destroyed. The prevention of sidebones is mainly secured by adopting proper rules of shoeing and preserving the feet. We defer their enumeration just now, and briefly detail the usual plan of remedial treatment.

Firing is a cruel measure, and we have discarded it long ago as highly improper; also blisters frequently aggravate the inflammation, and cause an extension of the ossification. Rest is the most appropriate thing to be observed first, and next promote the growth of the hoof, by means of foot ointments regularly applied. A little cooling medicine is very useful, and the diet should be laxative; while a large box, well littered with sawdust or chaff, with straw above, is allowed where the animal may remain in quietude. The use of an anodyne liniment may be directed round the coronets, two or three times a-week; and, alternating with them, fomentations by means of flannel bandages, wrung out of hot water and bound around, will be found serviceable. These should remain on

l dry, after the process has been con-
ed—say half-an-hour.

'hen the shoes are applied, which may
lone in about a month, care must be
:rved to take the pressure from the heels
neans of a bar shoe, and place it upon
frog. The animal should be put to very
work at first, and, by degrees, as the
acquires greater strength and protection,
the diseased parts having lost their previous pain and tenderness, the heels may again receive the weight, and the horse be enabled to perform heavy but slow work with ease for years. With this treatment, a horse in our possession has been restored, and now draws a private carriage over the stones without the slightest signs of pain or lameness. —*G.*

The Dairy and Poultry-Yard.

UN-INTERMITTENT FLOW OF MILK.

DURING the month of August and the first part of September, milch cows should have special attention in their feed, and not be allowed to shrink low in their milk. The grass in pastures begins to deteriorate in July, and during the hot weather usual in August and September, pastures fail to yield a sufficient quantity of succulent and nutritious food to keep up the flow of milk. If stock get no other food than that which they pick in pastures, the yield of milk will rapidly fall away. When the flow of milk is checked—even for a short time—it is difficult to bring the yield up again to the old standard, notwithstanding the cows get an abundance of food. This will have been observed by every one who has had the care of dairy stock.

We have seen a slow and inferior milker, in a few days, materially injure a cow for milk, and so much so that when afterwards milked by a first-rate hand, the yield of milk could not be brought back again for two or three weeks. It is important that milch cows have an abundance of fresh and nutritious food from day to day. The tall, rank grass in pastures, which has been rejected by stock during the early part of the season, is now dry and woody, and is incapable of producing the best quality of milk, to say nothing of the decrease in quantity. Cows, it is true, from a lack of other food, may be compelled to consume it, but the consumption of such food will prove of very poor economy to the dairyman. If the soiling crops commonly grown, such as sowed corn, millet, and the like, are not provided, or are not ready for the sickle, then the second growth of clover from the meadows and patches of ground that were mowed first, may be cut and fed to the cows in the stable.

When fed in this way, every animal gets its share, the food is not tramped upon and wasted, and master cows have no chance to injure the underlings, as often happens when out-door feeding is resorted to. There are other advantages in soiling cows in the stable. They are not so uneasy and troublesome as they sometimes are when fed in the open yard or field. If feeding but once a-day is determined upon, the better time is to put them in the stalls between three or four o'clock P.M. The feed of course should have been deposited in the boxes or alley previously, so that sufficient time will be had for feeding before milking. When this course is adopted, the animals as they come to be milked are quiet, good natured, and will give their milk more freely than when fed after milking, as is practised by some.

Many think there is quite a saving made in feeding aftermath in the stable. There is not that waste of feed which results from turning stock upon meadows, where they trample down and destroy often quite as much as they eat. It is true there is some labour and inconvenience in feeding aftermath in the stall, and yet, when grass is good, a mowing machine will soon cut enough for a large herd. Those that have patches of meadow lands ploughed and put to corn or other crops, or where it is not convenient to turn stock until late in the season, will do well to adopt the plan of cutting and soiling cows in the stable.

We are not sure but what meadows would be improved by feeding the afterfeed in this way, since the tread of cattle upon the lands would be avoided, and the grass in patches would not be taken down so close, and the roots pulled up as sometimes obtains when stock is turned upon the aftermath.

Of course, meadows, to be managed properly, ought not to be pastured at all, and but one crop taken annually from the ground, unless treated regularly to top-dressing and kept in a good state of fertility. But this course is considered impracticable by most of our dairy farmers, who believe that more profit is realized by cropping the aftermath than would result to the land by leaving it to decay for the purpose of renovating the soil and furnishing food for the next crop.

Next to green clover, there is no soiling crop so easily raised and which produces better results in milk, than corn fodder. It should be cut and allowed to wilt before feeding, as by this means it is freed from some of its surplus moisture. As a supplement to pasturage where soiling crops are not ready, or where they are deficient in quantity, good results may be obtained in keeping up a flow of milk by feeding bran or ship stuffs. These can often be obtained at moderate cost, and pay well in keeping up a flow of milk until such time as soiling crops and the afterfeed of meadows become abundant.—*Rural New Yorker.*

BUTTER—WASHED AND UNWASHED.

IN reply to "E. R. P." West Hartford, Mo., who says:—

"I have been told by an experienced butter maker, that butter washed would keep longer than unwashed butter; please inform me through your columns the truth of this matter."

The *Rural New Yorker* gives the following advice in favour of washing butter:—You are correctly informed, according to our views in this matter. The butter globules are encased in a thin pelicle of caseine. In churning, these pelicles or skins of caseine are broken and the butter liberated. Caseine is a nitrogenized substance very liable to putrifaction, and if these thin pelicles, which are mingled with the butter when it comes from the churn, are not, for the most past, separated from the butter, they soon begin to decompose, and are changed into a ferment, which gives rise to the formation of butyric, capric, caproic, and coprylic acids. The first three of these acids have an unpleasant smell, and the last a disagreeable taste; and it is on account of the presence of these acids that butter assumes a nasty, bad flavour. How then can we most thoroughly get rid of these caseine skins? Certainly not by working them over with the butter without sufficient moisture to separate from the oily particles, but by washing the butter as it comes from the churn. This is simply a common-sense view of the matter to any one who understands the philosophy of butter-making, and it is a view sustained by the experience of a majority of the best butter makers.

It is said that unwashed butter contains from 6 to 8 per cent. of thin caseine shells, while butter that is washed has only 1 per cent. If this be true (and we have no reason to doubt it), we have a very substantial reason why butter should be washed. It is asserted, and perhaps with some show of reason, that unwashed butter, when freshly made, has a more delicious aroma than washed butter, as the washing is liable to carry off those delicate flavouring oils to some degree; but granting that the unwashed butter, when first made, may have a slight advantage over washed butter in this regard, if it soon begins to lose flavour and deteriorate on account of its caseineous properties, the slight gain at first is of no comparative weight with the disadvantages which follow.

Butter makers should strive to make butter of good keeping qualities. Dealers and consumers want something that will not deteriorate on their hands. We can't all get butter the day after it is churned, nor does

any one care to be forced to over-eat of a good thing to save it from spoiling.

Then there is another strong argument in favour of washing butter. When the buttermilk and caseineous matter is expelled simply by working the butter, there is always danger of overworking it, and thus spoiling the grain. This is especially the case, except the butter maker possesses high skill in his art, and is always on guard to do duty with perfect exactness; for as the rancid taste of butter is due to one or more of those acids which we have named, it will be seen that it must in some way be freed from the caseine which gives origin to them.

We are aware there is a class of good butter makers who are opposed to washing butter. Many of this class are very skilful, and manufacture a superior article; but their success is not due to the fact that the butter is not washed. If by their superior skill they are able to work their butter so as to free it pretty thoroughly from the caseine, it is no argument against washing. We have made a good many experiments, first and last, in the manufacture of butter, and have tested a large number of samples of butter from the best makers, both in this country and in Europe, and from the light of this knowledge, we are in favour of the washing theory.

The Naturalist.

INSECTS INJURIOUS TO VEGETATION.

HE butterflies of the *Nymphalidæ* family have almost without exception the egs short, and not fitted for walking; biæ and tarsi of the male are often d at the sides with a fringe of fine hairs, ig a flattened brush; the tarsus con- f a single elongated joint, blunt at the nd without claws; the eyes and labial are large, the latter extend considerably nt of the head; the thorax is large, and ings are large and often greatly variegated our, and marked with ocellated spots; rva is long and more or less spined, it nerally not attenuated behind, and is at the end; the chrysalis is elongated, s simply suspended by the tail, hanging e extremity of the body, and not girt s the middle by a skein of silken thread. Bates found out, when in Brazil, how tinguish the sexes of the Nymphalidæ e fore legs—the fore tarsi in the males a few pairs of minute spines at the apical , which are not found in the other sex. difference prevails in the Heliconidæ, idæ, Erycinidæ, and probably in the mmati.

e Painted-lady butterfly (Cynthia cardui) versally distributed; it is found through- Europe, Asia, Africa, and America, in land, and a specimen has been taken r north as lat. 57 deg., and west long. leg.; it has also been taken in Terra uego.

nessa Urticæ, Vanessa Polychloros, ssa Atalanta, Vanessa Antiopa, Grapta bum, and the Argynnis and Melitæa a, are all nymphalidous butterflies.

e larvæ of the Nymphalidæ are very is, and no less curious are the angled alides.

To the Nymphalidæ belong the genera Limenitis, and Apatura. The former genus with its allies, Neptis and Athyma, abounds in exotic species. One of our rarer British butterflies belongs to this genus. It is the Limenitis Sibilla or the White Admiral. The larva feeds on the Honeysuckle.

The Amazon butterfly (Catagramma excelsior), is one of a set of truly gorgeous South American butterflies, the under sides of which are so curiously marked. Columbia is particularly rich in species. Epicalia Penthia is one of a genus, the sexes of which differ greatly—so much so, that the males and females of one species have been described as two species of two genera.

To this family belong many gorgeously decorated butterflies, the males of which are shot over with vivid purple, or with metallic green and blue.

In this country we have one of these, though it is confined to the southern parts. The butterfly is named the "Purple Emperor" (Apatura Iris).

The Caterpillar of the Purple Emperor feeds on Sallows and on the Poplar; it is a pretty object, especially to the collector, who much admires that singularly armed head, which has two horns on it, somewhat like a snail or slug. Its colour is pale green, with slanting yellow lines and a yellow stripe on each side. The chrysalis is suspended by the tail on the under side of a leaf. The male is a truly beautiful insect, having for its basis colour blackish-brown, which, as the insect turns to the light, seems to change into the most brilliant purple, the colour varying most surprisingly at every turn, while the white band and the broken white spots relieve the hues in a manner that is charming.

An insect from South America (Apatura laura) is one of a set washed with silver on the under side, and having the finest "shot" of green and blue running over the greater part of the upper wings.

The *Celænis Dido* is a handsome, though not very showy butterfly, named by its first describer after the Queen of Carthage, celebrated in the classic page of Virgil. Mr H. W. Bates found it and other species of the genus very abundantly in June 1852, on the river Amazon.

In the *Morphildæ* family of butterflies are many of the largest and most brilliant of the diurnal Lepidoptera. Although some of the group are found in Asia and the Asiatic islands, by far the larger number are peculiar to South America. M. Lacordaire describes some of the species of Morpho as flying majestically round the tops of trees. Although he spent twenty months in Cayenne, and frequently saw some of these, he was unable to capture them, while others differing from them in mode of flight he occasionally captured, as they jerked forward to the distance of eight or ten steps at a bound, and thus progressed rapidly through the forests. Many of the species have on the upper surface large masses of shining blue on a dark ground, and the under side of the wings is ornamented with many ocellated spots. The body is small and slender, the head of moderate size, and the eyes generally large and prominent; the labial palpi are generally erect, small and wide apart, generally clothed in front with depressed scaly hairs. The antennæ are slender, and end in a very slender club; the fore wings have the discoidal cell much elongated and always closed; the hind wings of the males are generally furnished with one or two tufts of hair near the base; the discoidal cell is in some open, in others closed, while the anal margin forms a deep gutter for the reception of the abdomen. The anterior legs are imperfect.

Some of the genera, such as Clerome, Drusilla, and Thaumantis, are peculiar to the Old World, being restricted to India and the Eastern islands. Some of them seem, as it were, to link this family to Satyridæ.

The *Morphos* are forest insects, rarely coming into the open grounds, and often flying for miles along roads and open pathways. Their flight is slow and undulating, but they are very difficult to take on the wing.

The family *Brassolidæ* is characterized by the very strong body, the small head, with very small palpi so closely applied to the face that they appear, when seen from above, simply to be two points between the eyes. The fore legs of the males are small and brush-like, and have, as in the Nymphalidæ, the tarsal joints obsolete. The species are all inhabitants of the warmest regions of the New World. The caterpillar is of a social disposition; it lives in companies of considerable numbers in a close web which it spins, and from this web it comes out only during the night to feed. This caterpillar changes into the chrysalis at the beginning of April, and the butterfly appears in two weeks after. The chrysalis is pale, spotted with dark red, and marked with four silvery spots; the butterfly is of a sombre brownish-black colour, barred with yellowish brown, and is said to fly very swiftly, and it appears only early and late in the day.

The insects of the *Satyridæ* family differ from the butterflies of the families Morphidæ and Brassolidæ, in having very long palpi, which are more or less erect and clothed in front with long porrected hairs; the hind wings have no prediscoidal cell, and the insects are generally weak compared with the stout large species so common in the preceding groups. They have a vast range, being generally scattered over the world; some of them, such as the species of Chionobas, are found in the arctic regions—dusky, dull, brownish butterflies, which with their *life* help, along with the flowers and grasses on which they feed, to enliven these dreary parts. There are more species of this family of butterflies in Europe than a-third of the whole number of European diurnal Lepidoptera; they are generally of small or moderate size, and their prevailing colour is brown—hence the name of "Meadow Browns," given to them by collectors. The under surface of

ings is generally ornamented with eye-like
. The larvæ are attenuated behind, the
ending in a fork or two small spines;
are covered with downy hairs. The head
re or less rounded, and is armed with
pines. These caterpillars almost exclu-
feed on grasses, which accounts for
wide geographical distribution. They
ot often seen, as they have the peculiar
of feeding only at night. Many of the
es, such as our Janira and others, in the
alis state, suspend themselves by the
while others, such as Circe, Semele, and
s, are found to retire into the ground to
rgo their change into the pupa state.
eggs are more or less globular. We have
n British species.

ie species of *Eurytelidæ* are chiefly
of the hottest regions of the globe;
as Asia, tropical Africa, Brazil, and
parts of South America. In this group
abial palpi are generally elongated and
ed with short hairy scales. The wings
enerally large and dentated or angulated,
not ocellated beneath. The fore wings
the costal vein always greatly swollen at
ase—a character which unites them in
respects with some of the genera of the
y Satyridæ. The fore legs are small;
of the male are more or less
and without tarsal articulation;
of the females are rather longer, and
the tarsal part jointed; they have no
. The larva is cylindrical or spiny, or
uated at the end, spiny on the head, and
times ending in two anal points. The
alis has several projections on the back;
the head is pointed and bifid; it is suspended by the tail.

The family of *Libytheidæ* consists of but one genus, which, however, has a most extensive geographical range. There are species in Europe, Asia, Africa, and America. They are distinguished by the possession of extraordinary elongated palpi, which are densely clothed with short hairs, porrected horizontally. The antennæ are short and gradually clubbed. The fore wings are strongly angulated below the tip; and the discoidal cell is closed in all the wings by a very slender vein. The fore legs are short: in the male they are brush-like, and have tarsi destitute of joints; in the females they are of the ordinary shape.

The caterpillar points out a degree of affinity which this so-called family possesses with the Pieridæ. It is cylindrical, not spined, and slightly pubescent. It is very delicately shagreened, and has pale longitudinal stripes on the sides, very closely resembling those of the Pieridæ.

The *Erycinidæ* is a very extensive family of small butterflies, of which there is but one British, indeed European representative—the little fritillary-like "Duke of Burgundy," as Nemeobius Lucina has been called.

In this family the perfect insect has only four legs adapted for walking. The larva is short, and shaped like a wood-louse. South America is the metropolis of this group; some of these—particularly the long-tailed groups—have a brilliancy of colouring not exceeded by the species of any other family of butterflies.

The Country Gentlewoman.

THE PARLOUR GARDENER.

CHAPTER VI.

CUTTINGS OR SLIPS IN THE PORTABLE GREENHOUSE.

Art of Striking Cuttings—How the Cuttings take Root—Cuttings in the Cold Portable Greenhouse—Cutting of Dwarf Succulent Plants—What is necessary to make them take Root—Cuttings from Leaves and Fragments of Leaves—Cuttings of Begonias—Cuttings of Dwarf Bengal Roses—Of China Roses—Of Pelargoniums—Of Indian Chrysanthemums—Cuttings in the Hot Portable Greenhouse—How this Greenhouse is constructed—Cuttings of Camellias destined to be Grafted.

COLD OR HOT.

THE prodigious multiplicity of resources contrived by Nature for the propagation of plants is assuredly one of the most curious of all the facts revealed by the study of vegetable physiology. Life is disseminated with such profusion in all the parts of plants, that with many of them the least fragment placed in favourable circumstances becomes a complete plant. The art of rearing from cuttings or slips rests upon the knowledge of facts of this nature. If it has never happened to you to strike any, or to see any struck, I will inform you that a cutting or slip is a part of a plant detached from the mother plant and put in the earth, in the hope that it will be able to take root there.

What is necessary to make a slip take root? It is necessary for it to live long enough on its own vital energy for young roots to form, and to draw nourishment from the soil. When the tissue of the plant is soft, and contains a good deal of water, and when the branch that is detached to serve as a cutting remains exposed to the air, the slip will not take root; it dries too rapidly; the operation fails. On the contrary, roots always form when, by the exclusion of the external air, evaporation is abated; whilst, at the same time, the lower part of the cuttings is in a medium kept constantly moist, which solicits its taking root.

CUTTINGS IN THE COLD PORTABLE GREENHOUSE.

Already, from what I have said, ladies, you have a glimpse of the utility that your cold portable greenhouse will possess for propagating every kind of plant by slips. We may begin by your pretty dwarf succulent plants, detached fragments of which will, under the shelter which it affords, take root with marvellous docility. Take, for example, a charming Opuntia, and separate one of its little shoots, by cutting it at the base with a very sharp penknife. If you put this shoot in the earth as a slip at the moment that you cut it, the surface of the wound in contact with the earth will rot, and not a root will come forth. To make sure of being successful, you must lay the slip on one of the shelves of your *étagère*, and leave it for two or three days, that the wound may begin to scar over before it is planted; when this takes place, plant it as if it had roots—and, indeed, it will not be long before it has them. To assure yourself of this, you need not pull it up, as children do, who, when they have put a bean in the earth, take it up once or twice a-day to see if it is going to sprout—so that it never comes up. So soon as your cutting has taken possession of the earth with its young roots, it will not fail to advise you of it by giving birth to little shoots at the upper part. The growing of the upper part of any plant whatever, propagated by slips, is the most certain sign of the existence of young roots. All the dwarf succulent plants of the garden on the *étagère*

can, like the Opuntia, be propagated by slips in the cold portable greenhouse; only taking care that the part separated as a slip be allowed to dry and begin to form a scab by contact with the air before planting it.

SLIPS OR CUTTINGS FROM LEAVES.

If you have renewed the contents of your flower-stand every season, you will have at the proper time Achimenes in bloom. This pretty plant is easily cultivated, and its numerous tubulated flowers, nearly the same in form with those of the Paulownia, are in colour of a beautiful light violet, or of a fiery red, regularly marked with yellow and purple within. Take off a leaf of Achimenes and stick it by its stem; it will take root, and this single leaf will in a short time become a perfect plant, similar to the one from which it was detached. But if the species that you desire to propagate by this means is rare, and you possess but one leaf, for which you are indebted to the kindness of an amateur, split this leaf down through the principal rib; split afterwards the two halves in four or five pieces through the side ribs; and these fragments treated as slips, will not fail to take root. But, as this plant is of very loose tissue, and evaporation might cause the slips to perish in a few days, even in your cold greenhouse, you will act prudently, if, besides the shelter which it affords, you cover them separately, each with a small glass turned upside down.

CUTTINGS OF BEGONIA.

Another genus of plants, not less agreeable, the genus Begonia, is propagated by slips of leaves in a manner somewhat different. The stems of the leaves of Begonias are of a cylindrical form; those of the Begonia manicata, or cuffed Begonia, are ornamented with an elegant fringe for about one-half of their length. If you stick one of these leaves in your portable greenhouse, do not be frightened, if, after the lapse of some days, the entire leaf fades and then draws up as if it had been shrivelled by a violent sun-stroke; the vegetable life is withdrawn into the stem; the operation has not been necessarily unsuccessful. When the leaf is dry, take the stem out of the earth; it will not yet have roots, properly speaking, but all around its lower edge you will distinguish little swellings composing a sort of roll, tolerably prominent; these are the rudiments of the roots ready to come out. This leaf-stem, although hollow within, is thick and fleshy. Split it into five or six slips, down its length; and each of these slips, provided it has at its base a portion of that little roll from which the roots are to come out, will become, in a short time, a fine plant of Begonia manicata. Just as many pieces as you have been able to split that stem into, just so many thriving slips will you have; all will take root.

An indefinite variety of plants, as well those found only in warmed greenhouses as those which are seen in others, can be thus propagated. It will be for you an inexhaustible source of recreation, and at the same time a precious resource from which to renew the contents of the flower-stand and *étagère*, at all seasons.

ROSE CUTTINGS.

To the above you can add a large collection of Roses of diminutive size, selected from the series of Bengalese and Chinese Roses; the Liliputian Bengals, which are reared in a pot of the size of an egg-cup; the Chinese dwarfs, of a bright red, which live very well in a tumbler of the ordinary size. The least fragment of a branch of one of these, stuck in the cold portable greenhouse, will take root and display its flowers the first year.

CUTTINGS OF PELARGONIUMS AND CHRYSANTHEMUMS.

Do not forget to stick also a full supply of the prettiest species of fancy Pelargoniums and Chrysanthemums of India; especially pompone (from the word *pompon*, the worsted ornament worn in soldiers' caps, in lieu of feathers) Chrysanthemums, charming little plants, very prolific in flowers. They bloom all the winter, and present, we may say, with the exception of pure blue, all the shades of the rainbow, and, in addition to

these, the purest white, and a deep purple, so deep as to be almost black.

These Chrysanthemums possess, as regards slips, a peculiar property, worthy of your attention; they furnish slips at all the various stages of their vegetation. Of such kinds as accord, in their natural dimensions, with the space that you have reserved for them, take, for sticking, young shoots between 1 and 2 inches in length. These slips will quickly take root, and in due time attain the normal size of their species; after which they will bloom. On the other hand, if you wish to stick some whose dimensions greatly exceed the space that can be disposed of in their favour, wait until the flower buds terminating the upper extremities of branches have attained about half of their size. Then detach such branches for slips, and plant them in pots, where they will very soon take root; their buds will continue to develop, and you will obtain as fine a bloom as that which remains on the entire plant. These slips, however, will not grow; they remain of the same size as when first planted.

CUTTINGS IN THE WARM PORTABLE GREENHOUSE.

Until now, ladies, I have spoken to you of such slips only as can be reared with success in the cold portable greenhouse. But you may rear a great many more, and these taken from the most interesting plants, if, for your cold greenhouse a warm one be substituted.

To say nothing of form, which may vary according to taste, the essential difference between these two portable greenhouses consists in one of them being warmed at will; to which purpose its shape and construction must, of course, be adapted. It must contain a lamp and a little reservoir for water; this reservoir having an earthenware cover, upon which the pots with the slips are placed. This cover is pierced with a hole, into which a funnel may be placed, for the purpose of renewing the water as it evaporates; and there must be lateral holes in the reservoir, for the steam to escape through. Underneath this apparatus is a place for the lamp—generally a spirit lamp—which is lighted only when you wish to raise the temperature of the greenhouse. Although the heat produced by the flame of the lamp is not very great, it suffices to warm the water in the reservoir

Warm Portable Greenhouse.

and the other contents of the greenhouse, to the degree requisite for maintaining its atmosphere at the proper temperature—say, at from 53 to 64 deg. of the thermometer.

CUTTINGS OF CAMELLIAS.

Provided with this addition to your resources, you may now add greatly to the variety of your floral decorations, and, whilst doing this, enjoy the pleasure of watching the growth of plants which refuse to take root in the cold greenhouse, but prove perfectly conformable to your wishes in this respect when provided with lodgings better suited to their tastes.

Let us begin by striking cuttings of Camellia there. This king of the shrubs of the cold greenhouse experiences great difficulty in making his start in life there. The labour of striking root proves generally too great for his vital powers, unless aided by artificial heat. Thus aided, however, as they now are in your warm portable greenhouse, these slips will form their roots in the space of from fifteen to twenty days.

You are already aware, ladies, that the most beautiful varieties of the Camellia

although they can take root from the slips, produce, by this means of propagating them, only ill-shaped, puny plants, that are little disposed to flower well. Your slips should be taken only from single-flowered Camellias; or, if from the double-flowered, then the white of the pink only. From these you can obtain all the slips you need; and these slips will become shrubs as vigorous as you can desire. By grafting on these shrubs, when a year or eighteen months old, you may multiply the choicest species and varieties; their bloom will be all that you can wish.

Grafting is another charming operation of horticulture, which you could not easily realize in the cold portable conservatory. In the warm one, on the contrary, you may graft all sorts of ornamental shrubs, and the success of your grafts is assured beforehand; not one will fail.

CHAPTER VII.

GRAFTS IN THE PORTABLE GREENHOUSE.

Of Grafting in general—Resources that it offers for fixing the fugitive Sub-varieties—Extent to which Grafting is possible—Orange Graft—Manner of operating—Wrappings of Woollen Yarn—Applications of the above Process—Pontoise Graft—Grafting the Camellia—The Camellia in its Native Country.

BEFORE learning how to perform successfully the different modes of grafting which belong to the domain of parlour horticulture, you may, perhaps, ladies, wish to be informed what grafting itself is, considered in a general point of view. Grafting, then, is, if I may be permitted to use the expression, a forced marriage, often very badly assorted. Of this particular kind of forced marriage, the consequences cannot be happy, except when the two individuals, united without having been consulted, are very near relations; that is to say, when they belong to species of varieties very proximate to each other. In the portable greenhouse, both cold and warm, we have just been practising, with complete success, the operation called *cutting or slipping*, in a variety of ways. Well, then, *grafting* is still another kind of slipping. Instead of putting the slip in the earth, that it may there live by its own roots, we join it on to another plant, where a piece has been cut away to make room for it. Then, instead of putting out roots of its own, that it may draw from the earth the sustenance which it requires, the graft incorporates itself with the plant to which it has been attached, and feeds upon the stores provided by the latter for its own support. This it does without changing its own nature, or modifying in any way that of the other. You may have remarked this in gardens. If a Plum stock, upon which an Apricot has been grafted, puts out young shoots below the graft, these are Plum shoots. In like manner, a Sweetbrier stock with a Rose grafted on it, produces only branches of Sweetbrier, exactly such as they would have been had the plant never been grafted upon. On the other hand, the graft, and all produced by it, retains the nature of its parent plant as perfectly unchanged as if it had continued to form part of it. Owing to this law, results the most curious and precious are easily obtained in horticulture. Varieties, and fugitive sub-varieties, which it is impossible to reproduce by sowing, difficult even to preserve by slips, are fixed and propagated indefinitely.

SURVEY OF GRAFTS THAT ARE POSSIBLE.

That I may not have to repeat, I will remark now, ladies, that the domain of grafting, the extent to which successful grafting is possible, is very great—so great that it has not yet been completely explored. You know, as everybody does, that fruit trees and Roses are grafted. I am going to have the pleasure of making you graft, in your portable greenhouse, Oranges and Camellias, wherewith to furnish your balcony garden when it shall come to be established.

ORANGE GRAFTS.

Here are the young stocks, the product of the Orange and Lemon seeds sown by you a year ago. They are the size of a quill; their wood has consistence, their vegetation is vigorous; it is time to graft on them. Let us take for grafts young shoots of a myrtle-leaved China Orange—one of the prettiest

varieties to cultivate in any apartment, whether on account of its numerous flowers, which are fragrant, but not too strongly so, or on account of the fruits that succeed these flowers, and which, preserved in sugar or in brandy, are a favourite treat for a numerous class of consumers.

With a newly-sharpened penknife, cut a little way into the wood, above and below the eye, making these cuts slanting, so that a small portion of the stalk containing that eye, shall be separated and fall, without the leaf being detached. Now, you have a cutting, the size and form of which you must examine with care. This being done, you must then, for the graft that is to occupy the vacancy just made by you, select a little branch of myrtle-leaved Orange, and the lower end of this must be cut into such shape as to fit very exactly into the place cut in the stock. As the graft, if left there after being fitted, would fall apart at the least shake, it requires to be fastened in its place, until it shall have taken firm hold and incorporated itself with the stock. This is effected by putting a bandage on. But here a difficulty presents itself, which has caused many a failure, but may, however, easily be surmounted by a little attention. If you do not draw the bandage tight enough, it will not hold the two surfaces in contact, and this would prevent the success of the operation. If, on the other hand, you draw it too tight, this will interfere with the circulation of the sap; your graft will be strangled, as the gardeners say. Take care, then, to adjust your bandage perfectly—avoiding both extremes; tight enough, but only just tight enough to keep the graft firmly in its place. Employ for this purpose untwisted woollen thread, which, in case you have drawn it somewhat too tight, will, from its elasticity, accommodate itself to what the sap requires, and prevent strangling.

APPLICATIONS OF THE ABOVE METHOD OF GRAFTING.

All graftings of this sort that can be made on other shrubs with persistent leaves, besides Orange trees, will prove completely successful, provided that at the time you graft them these shrubs are full of sap—that is, that their vegetation is in full activity. Strictly speaking, in ornamental shrubs with persistent leaves, the sap is never completely stationary, as it is in winter with those that lose their leaves. They have, however, a half repose in winter; after which their sap begins to flow again with renewed energy. This is the most favourable time for grafting them.

GRAFTING A LA PONTOISE.

As to the Orange, its vital principle is so very active that you can, without fear, trust a graft quite full of flower buds ready to bloom, to a seedling stock a year or eighteen months old. The graft should be of a diameter nearly equal to that of the stock: it will take directly. The course of the sap is not sensibly interrupted, and the buds will open as if they had remained upon the shrub from which they were detached. In all cases, the entire stock above the graft should be removed, so that the portion of the stock below the graft shall form merely the lower part of the trunk of the tree, whilst all above shall be formed from the graft exclusively. If this sort of grafting, named by the French gardeners *grafting à la Pontoise*, were conducted in the open air, the evaporation from the leaves would kill the graft before it took. It can succeed only when excluded from contact with the air. Your Orange trees grafted in this manner will be perfectly sheltered under the glass of your portable greenhouse; which you must take care to keep close shut, until your grafts, by continuing to grow, give you assurance that they have taken

THE

UNTRY GENTLEMAN'S MAGAZINE

NOVEMBER 1871

)O HARES AND RABBITS CARRY DISEASES TO CATTLE?

N interesting correspondence, in which . Sir James D. Elphinstone, Professor)nds, and others, have been taking part, for some time been going on in a northern r, as to whether hares and rabbits can r disease from an infected herd of cattle heep to a clean one. As the subject ot-and-mouth disease, the means of its ıd, and its prevention, is one engaging h attention at the present time, we give ternel of what has been said upon the er.

he ball opens by the Northern Knight ıg the Southern Professor whether such ng as hares and rabbits carrying disease tock, was possible; whether contagion, as that of foot-and-mouth disease, "could and was, in fact conveyed by ground ." It may here be premised that Sir s holds the opinion that ground game innocuous. Most game-preservers are ed with the same notion, and he desires rtify himself in his belief with the autho- f a man in such an exalted position as ssor Simonds. The question is put at kind of insinuating way which lawyers t after they have been challenged by the site counsel, and checked by the judge, ggesting an answer to their query at the of the asking.

ofessors of veterinary science are, we me, as susceptible to influences of flattery ther pleasant recognitions as professors emistry, and we all know how many of these great men gave their analyses of various kinds of manures and other substances in such a judicious manner as to be highly agreeable to the manufacturers, although not always quite satisfactory to the farmers who purchased on the strength of their printed assurances.

Professor Simonds's reply to Sir James Elphinstone is, although evidently designed to be extremely careful, yet somewhat lacking in discretion. After noticing the class of diseases to which foot-and-mouth disease belongs, he remarks that its "*materies morbi* are conveyed from animal to animal by various agents, which may, perchance, have come in contact with the diseased. But although it is so, I nevertheless consider it the most unlikely thing possible for the malady to be spread by hares and rabbits." So far so good the opinion, but unfortunately, as a 'cute "V. S." immediately discerns, in endeavouring to prove the impossibility of ground game being the transmitters of disease to cattle, the Professor cuts the ground away from his own feet—

He straightway turns his back upon himself, &c.

He says, "To be so" (that is, possible for hares and rabbits to carry contagion, we presume), "it would be necessary that these animals should come in contact with the saliva which is dropped from the m of the infected cattle while it is still ir and fluid, and then that they should

directly to another herd at a distance, and absolutely come in contact with one or more of them at once." At this point we leave Professor Simonds in the hands of his northern critic, "V. S.," who remarks, that Professor Simonds in his last sentence imposes conditions quite unnecessary to the spread of the disease. "Why," he asks, "should a hare or a rabbit with saliva from a diseased beast's mouth on it, have to travel directly to a herd at a distance, and absolutely and at once come in contact with one or more, in order to infect them, while other animals—men and dogs, for instance—can do the same thing by a roundabout road at their leisure, and that, too, by simply leaving the infectious material among the grass or the other food the cattle eat? As to the other conditions specified for the spread of infection by these animals, they are easily accomplished by them. Perhaps the hares and rabbits living in the Professor's neighbourhood, near the Metropolis, may have reformed their manners; but the ones in the far north there retain the antient habits of the race, and do the most of their travelling in the night, when, as they may occasionally roam in a field where diseased cattle are enclosed, they will have no difficulty in getting themselves besmeared with saliva fresh and fluid from their mouths, the which they will, in the enjoyment of their freedom, carry into other fields, and deposit on the grass, to be picked up by the cattle as they feed next morning, perhaps within an hour after the rabbits have retired to the woods for repose and rest, so as to fit them for repeating the same process in a new field next night. Thus they go on, night after night, till the cattle in all the fields adjoining the woods they frequent, have had foot-and-mouth communicated to them."

This subject is one that must not be settled in the off-hand manner Professor Simonds adopts. It is an extremely important one, and demands further investigation at the hands of veterinary practitioners paid by national societies to look after the agricultural interest. The fact, whether hares or rabbits do or do not carry contagious diseases to our herds and flocks, will have a most important bearing upon the Game-law question; for if it be proved that they are dangerous in this way to our live stock, the preservation of them will be simply impossible. Exertions should be made to ascertain the truth before next session of Parliament.

TREATMENT OF FOOT-AND-MOUTH DISEASE.

By Professor POLLI, Milan.

THE following article, written by Professor Polli, of Milan, was found among the papers of the late Sir J. Y. Simpson, and furnished to the *Midland Counties Herald*, by Mr Lawson Tait:—

Directions for employing the sulphites in the foot-and-mouth disease (epizootic aphtha), the carbuncular fever or charbon, the Hungarian pest or cattle plagues, by Dr Giovanni Polli, extracted from the *Bollettino Industriale del Regno d'Italia*, published under the auspices of the Ministry of Agriculture.

The pathological principle on which the treatment by the sulphites rests, is the admission of an altered condition of the blood in epizootic diseases as its principal factor or cause, induced by the reception into it, or by the development in it of a particular morbific ferment. The dyscrasix or faulty condition of the blood, against which both animal functions and nutritive processes are stirred into reaction, originates or sets up the malady. The cure may be said to consist in arresting this decomposition of the blood, of which what we call the prophylaxis

:hing else than the prevention. For this ɔse, we avail ourselves of a remedy that y well borne by the economy, with no venience attaching to it. It has also ıroperty of rendering the organism re- ıry to the influence of morbigenous :nts, and, moreover, of arresting their .tions, and so allowing the animal or- m to work itself clear of their effects by mary eliminations. This remedy is no than the combination of sulphurous with alkaline and earthy bases. The ite of soda, by its solubility, and also ; low price, is the most convenient of for curative operations, while the hypo- ite is most appropriate for prevention of isease or prophylaxis.

'ENTIVE OR PRESERVATIVE TREATMENT.

ıenever a healthy herd of cattle, goats, or a flock of sheep, have in their neigh- ıood an infected animal, stalled, penned rded with them, where contact with such ɔeen possible, direct or indirect, you dread the coming of the disease. You :hen employ the preservative method, cting all animals alike to the following :ss of treatment:—

r every head of beast you make a solu- of 3½ ounce (100 grammes) of hypo-sul- of soda, dissolved in a small quart of (a litre), and add to 1 ounce or so to 30 grammes) of common culinary ɔ make the drench more palatable, and o assist its action. This solution to be daily, divided into two doses, that is ', half the quantity to be taken in the ing by the animal, and the other half : evening by way of drench with the or in the same way morning and even- the same quantity of the salts may be with flour mixed up into a paste in :aking care to make the animal drink quart or quarts of water soon after ; the balls or bolus. From the time ıysic is given, no food should be allowed hour, and after taking the food the space ı hours should elapse before the salts are ıistered. This treatment should be 'ered in so long as, from the existence of epizootic disease in the neighbourhood of the animals, there is danger of its diffusion to non-infected stalls.

If the animals so treated by the hypo-sulphites have too much looseness of the bowels, it is best, on alternate days, at least, to give but half the morning dose; or even you may find it necessary to cut down all doses to one-half, for purging is not desirable; for otherwise, than so the salts should be absorbed and taken up into the system so as to confer upon it the faculty of thorough resistance to all morbific ferments.

For the use of sheep, goats, and swine, the dose that has been mentioned for cattle may be reduced to one-third or thereabouts of the quantity already stated, *i. e.*, rather more than a ½ ounce (20 grammes) to be given in the morning, and the same again in the evening, or rather more than 10 drachms during the day of hypo-sulphite of soda in watery sulution or bolus. The addition of a little common salt may be at any time made whenever it is thought advantageous to make the animal better savour the lump of paste or solution with the salts. Extreme cleanliness in the stalls, frequent aeration of the shed, a good selection of food, great purity of the water drank, all these should be scrupulously atended to.

CURATIVE TREATMENT.

When in any herd or stall of cattle—and the same with sheep, goats, and swine—there is present the epizootic disease, to every healthy head of animal you will continue the preservative treatment, that is to say, with the hypo-sulphite of soda, in manner above described. Any animal that is affected with the disease should be subjected to treatment with the sulphite. For cattle, the daily dose of the sulphite should be 3½ to 5 ounces (100 to 500 grammes), dissolved in a quart or somewhat less of water (a litre), with addition of 1½ (50 grammes) of common salt, one-half of this quantity to be given in the morning, and the other half in the evening, either in solution by means of the horn, or the salt may be mixed into a bolus or ball with flour in paste, in which latter case it is

necessary that the animal should imbibe soon after some quart or quarts of water.

Between the taking of the salts and any kind of food one full hour must be suffered to elapse; so, again, after food has been taken, two hours' interval should be enjoined before the physic may be given.

The utmost cleanliness of the stall, removal of dirt and litter, great freshness of the bed, purity of water drunk, and ventilation of the premises, are wholly indispensable to success in treatment.

For the epizootic aphtha (the foot-and-mouth disease), the pustules and ulceration that is found about the mouth and lips, on the tongue, and dugs and cleft of the hoof, should be all well washed and dressed with tow that is well wetted in solution of the sulphite, one part of it to ten in water to be made fresh every day. The best preparation and most useful detergent, when the skin displays any raw, is a concentrated solution of the sulphite, one part to six of water.

If from the severity of the complaint or aggravated condition of the mouth, the animal resists very much the employment of the drench or ball, we must then have recourse to clysters, giving the salt in solution as before, but increasing the sulphite in quantity for the purpose by a-quarter or a-third, and doubling the quantity of the water. Let it be divided into four equal parts, to be given at regular intervals, so as to be better retained, and purging in that way avoided.

During all employment of the sulphites, it is necessary to refrain absolutely from the use of acid substances, whether internally or externally, such as vinegar, cream of tartar, lemon juice, wine, &c.

The dose of sulphite of soda for the smaller class of animals (sheep, goats, swine, &c.) should be reduced in due proportion according to the size of the animal, as low as 1 ounce daily or perhaps a little more (30 or 40 grammes), divided into two doses, and administered with the same set of rules. With these smaller animals we use the clysters just the same as with the cattle.

The droppings of animals that have been under treatment with the sulphites and hypo-sulphites are apt to give off strong exhalations of sulphuretted hydrogen. This odour is not deleterious, however it is disagreeable, but rather it is depurative and beneficial to the cattle in the stalls, since it permits a part of the sulphurous principles to enter the organism by the channel of the breath, where they give opportunity to the production of the sulphurous acid and the sulphites.

If complained of as inconvenient to those who tend the cattle, it may be mitigated by freer ventilation, or a thorough fumigation with chloride of lime and oil of vitriol in an earthenware pail, once or twice during the day. When the apprehension of epizootic disease has lasted for a considerable time, necessitating the use of the hypo-sulphites for some time by way of prevention, there is no cause to fear about the milk, nor yet for the flesh of the animals that have largely partaken of the salts. Both, indeed, are so far improved that they resist the ordinary decomposition. Under equal circumstances and conditions, the milk that is taken from these animals continues fresh for a longer time than is the case with ordinary milk, and it does not pass so rapidly through the customary changes. When such milk is used for making cheese, it requires but a little more pressure. The flesh of oxen slaughtered after a long use of the hypo-sulphites, will keep sweet and free from taint for a notably longer period than is the case with the flesh of animals that have been treated by the sulphitic medication. The same is true of other flesh, as that of sheep, goats, or swine.

NOTE.—The mouth-and-foot disease, the carbuncular fever or charbon, the cattle plague, or foreign pest, are three several diseases, having each its specific cause, and consequently are unlike in character or in the amount of alteration produced by them in the economy. But, as the treatment of the sulphites does not do away with that cause (nor could it be hoped that one single thing could destroy such various causes), but rather by a particular action, which is termed catalytic in chemistry, it arrests and paralyzes their effects; the organic components of the body are thus protected and rendered impregnable

the assault of the morbific fumes through chemical property of the salts. One can derstand, then, how the same treatment y apply to the several diseases, and also to h other maladies as have for their common aracter a morbific fermentation. The nature the morbific principle, is more or less of ulence, the predisposition or aptitude of animal that may be exposed to its influce, will instruct us how far we may modify, cording to case or circumstance, the curative d preservative treatment. In this way, either ophylactically or curatively, you may raise lower the dose, keeping in view the stand- l quantity, endeavouring, for such should your aim, to make it enter the circulatory rrent, by whichever path administered, in h proportion as is indicated by the ength of the morbific principle you have at time to contend with. In allowing your- f any such change, it is always best to bear in mind that the hypo-sulphite of soda is more purgative in character than is the case with the sulphite; and that the gastro intestinal mucous membrane, in blood infections, generally is disposed to an extraordinary secretion (diarrhœa or eliminative dysentery); and when you have for your aim to have retained in the body the drench or sulphitic injection for so long a time as is needed to ensure the absorption of the same into the blood current of the animal, it may be better to give the salts, in preference to a watery solution, in a starchy or feculent fluid of non-purgative character, better perhaps in decoction of poppies, or something a little binding and sedative.

The description of the salts is omitted in translation, as now they are tolerably well-known, but they should be of sound chemical constitution. The foreign weights quoted are original, and therefore the more exact.

MODERN AGRICULTURE AND THE YIELD OF WHEAT.

N his estimate of this year's harvest, published in the *Times*, Mr Thomas C. ott is of opinion that the wheat crop is lisastrously deficient," and that we shall ve to import 13,000,000 qrs., costing probly £35,000,000. Mr Scott thinks that if e agricultural resources of the country were lly developed, a better result, and less dendence on foreign supplies, would be tained. He says:—

Last year, in my letter in your columns on e 8th of September, I estimated the area der wheat at 3,800,000 acres, and it turns t to be 3,773,275 acres, or 26,725 acres s. The home produce I estimated at ,250,000 qrs., the consumption at ,250,000 qrs., the seed requirements at 00,000 qrs., making 22,250,000 qrs., and foreign imports required, 8,000,000 qrs., d they have been 8,017,856 qrs., or 17,856 . in excess of my estimate. Although a siderable breadth of wheat-sown land was ploughed up last spring for other crops in consequence of wheat failures, I am still inclined to adopt the area of last year—namely, 3,800,000 acres—as the wheat break of this; and taking the average produce at 21 bushels an acre, we have in round numbers 10,000,000 qrs.; deducting from this 1,000,000 qrs. for seed leaves, 9,000,000 qrs. for consumption. Seeing then that the population has increased nearly 500,000, equivalent to a consumption of 343,750 qrs. of corn, and that the ability to consume of three-fourths of the population has been augmented to an equal extent by increased employment and wages, we have 687,500 qrs. to add to last year's consumption, making 22,000,000 of qrs.; deducting from this the 9,000,000 qrs. of home produce, we have a deficit of 13,000,000 qrs. to be provided for by foreign importations. In 1801, our wants were represented by an importation of 500,000 qrs.; in 1840, by double that quantity, or 1,000,000; during the last three

years they have fluctuated between 8,000,000 and 10,000,000 qrs., and now we appear to require twenty-six times the foreign aid we did at the beginning of the century. To those who have long hoped, and, perhaps, still believe that by improved farming home produce would overtake and outrun the increase of population, and that our only safety was independence of the foreigner, the above facts must be rather alarming. If, as Lord Derby said the other day, the land of this country is capable of producing double its present yield by the application of increased capital and facilities to draw it out, of which I have no doubt, it is evident the owners of the soil have a serious responsibility resting upon them, and the occupiers a great duty to perform. Since the final repeal of the Corn-laws twenty-two years ago, the rate of importations has far exceeded the rate of increase of the population, shewing clearly a decrease in the home production, arising either from a reduced yield per acre, or a reduced area under wheat. We had no agricultural statistics at the earlier date to enable us to test the latter supposition, but as we are constantly taking in commons and reclaiming waste lands, there can be little doubt that our reduced wheat produce does not arise from a reduced area under that cereal. What steps, then, are open to us to stay this decadence? Are there any general impediments to capital flowing upon the land? Would a national tenant-right facilitate it, or leases induce it? On many of the larger estates in England, the latter do not exist, nor would they be appreciated if offered, because the landlords have known hereditary principles on which dependence can be placed. But those who have not hereditary principles are increasing in number every day, and necessitating legal securities for the capital that has further to develop the resources of the soil. Laying down mediocrity soils to permanent pasture is one of the agricultural necessities of the day, but who would undertake this, unless he owned the land or occupied it under a compensation agreement? On the other hand, if a tenant draws unfairly upon old pastures by breaking them up or applying the scythe, or exhausts old arable land by excessive cropping or under manuring, the owner is equally entitled to compensation. The old and still favourite theory of production was to keep stock, with a profit if you could, without, if you couldn't; but as manure makers, stock must be kept, and in support of this theory, I at one time strenuously advocated an embargo being put upon the importation of foreign animals, believing that if we had the privilege of feeding all the cattle we consumed, we could grow all the corn we required. If anything could modify this belief, it would be a visit to Mr Prout's farm in Hertfordshire. There I walked lately over 450 acres of land, all under the plough, on which not a hoof or a horn has been kept for ten years, except the work horses, and even these are all but superseded by the steam engines. In an experiment made this season, and still open to inspection, on potatoes, mangolds, swedes, carrots, and maize, I have found that excessive manuring does not lead to profitable results; but on Mr Prout's system, applied on the Bagshot sand formation, I should not have expected any crop at all. Mr Prout purchases artificial manures, it is true, equivalent to £3 an acre, but his main dependence is on the soil itself and the atmosphere, in opposition to shallow tillage and the dung-cart, and already a great part of his land is laid up in the rough, imbibing atmospheric nutriment for next year's crops. Whether or not this great experiment will succeed in the long run, cannot yet be considered a settled question, although it has now been on its trial for ten years. It is difficult to make up one's mind on the subject, and Mr Prout has not made up his own. If the mineral taken from the soil by the crops is restored by applications of bone-dust, which I believe it is, there is no reason why it should not succeed: and, if it does succeed, it will create an era in the history of agriculture on strong soils. We know that the virgin soils of America become unproductive from continued cropping; but then we know that the occupiers have not drawn upon the atmosphere for

en by deep cultivation, and restored nerals carried off by the crops by the ation of artificial manures. Inductive ing has never yet done anything y for agriculture, and it is therefore to ence alone that Mr Prout is looking truction, considering it the only safe to any system worthy of becoming an ed practice. If we compare this with echi's diametrically opposite principles ractice, where, on very similar soils, ess stock-keeping is the basis of all his ions, it would puzzle the most impar- decide which system to advocate or especially when we see, as I did this , the best wheat crops, in both cases, ere to be seen. Tiptree Hall is now itated, and those who formerly went to hear advanced theories propounded, ow return to see good farming prac-

It requires no balance-sheet this year ve that the farm is in a paying con- which must be doubly satisfactory to ner, considering how often he has been to prove his theories by results. Mr Prout, possessing no theory, only offers results for consideration, and these are as follows, for this year's crops, all sold off:—

	Acres.					
Wheat	153	at	£13	10	equal to	£2066
Barley	98	,,	9	1	,,	897
Oats and beans...	90	,,	8	16	,,	792
Clover and sainfoin, growing, and in hay ...	88	,,	14	16	,,	1302
	429					£5057

Some sainfoin has been retained for seed equal in value to £50, and the horses, six in number, have been maintained off the farm. After charging the farm with rent, at the rate of 40s. an acre, interest on capital at the rate of 5 per cent. per annum, rates, taxes, labour, manures purchased, £1500, and all proper charges, the result will be a net profit of over £3 an acre. Mr Prout has drained nearly all his land 3 feet and 4 feet deep, and considers, like many other occupiers on similar soils—marl and chalk—that the annual extra produce is equal to 8 bushels of wheat per acre.

IMPROVED AGRICULTURE IN IRELAND.

WE take the following article on the improvements effected during the irty years on the estates of the Earl of county Mayo, from the *Irish Sports- nd Farmer*.

en the present Earl of Arran succeeded icle, in 1837, he found those estates most wretched condition that they possibly be, and the occupants steeped most abject state of helpless misery. late Earl, from delicate health, was an ee for many years, and those placed in of the property grossly abused the eposed in them, and, by the most un- of misrule, suffered the lands to be rated and covered with a pauper tion, struggling for existence, the land unable to feed them, much less able to pay any rent—the result of the management falling into the hands of corrupt unprincipled agents, or receivers, who let townland after townland to *squireens*, without capital, or any knowledge of agriculture, who, immediately on getting possession of those fine pasture lands, sublet them to a class of tenantry, in common without capital, the middleman having no other means, living on the profit rents, and caring little about either the land or its miserable occupants, who were left to their own resources, and permitted to do just as they liked, so long as they paid the rent, each or any of being liable for the entire rent. Those tenants, in common, erected a cluster of wretched hovels, which they denominated villages, and divided the land in rundale, some

more and some less, according to their means, so that each had a patch of good, middling, and bad land scattered here and there over the townland.

In process of time, as the population increased, hovel was thrown up against hovel, and the land became still further divided, and filth, squalor, and wretchedness prevailed inside and outside the wretched dwellings. There being no fences, the cattle roamed at large after the crops were removed till the return of spring; the store cattle were sent to the mountains or bogs early in the summer, to exist as best they might; the milch cow was kept at home, and herded on some waste patch by a child or some aged person past labour, during the day. All were then in a hurry, early and late, in the spring and till far advanced in the summer, to get in the crops; then came the temporary fencing between the arable and waste lands to keep off the cattle, and thus the season passed till the crops were harvested and secured, when the whole arable lands were again thrown open to cattle, sheep, pigs, goats, and poultry in common, so that any attempt to grow clover, ryegrass, turnips, &c., was completely out of the question. In the course of time, the leases, which were granted generally for thirty-one years and three lives, came to an end, and the unfortunate landlord, instead of finding his property improved, or, at least, in the condition in which it was demised, to his horror found it exhausted, vastly reduced in value, and unable to feed the occupants, let alone paying rent for it.

When the present Earl came into possession his horror and chagrin may be imagined, but description is impossible. Friends advised some one thing and some another. Sympathizers suggested that as those unfortunates were not his tenants, they had no claim on him, but his Lordship thought and acted differently. He admitted that the case was most unfortunate, but as he had got and was now placed over them, he would see what could be done to humanize and lift them out of that state of misery and moral decrepitude in which he found them.

Among those whose aid and advice would be most likely to be thoroughly practical and disinterested was the late Mr James Fraser, so many years celebrated as a rural architect and designer of land improvements, and whose practical experience and thorough knowledge of the country could not but be of the utmost value in such a vastly important case, involving the improvement of many thousand acres, and the social condition and welfare of thousands of human beings. Mr Fraser came, and, after careful consultation, respectable surveyors were employed, a census taken, rentals examined, and the result was the breaking up of those villages of beastly hovels, laying out good and convenient roads, a re-division of the lands, giving each tenant his portion in one lot in proportion to his rent, instead of a patch here and there; lots were cast, straight lines of fences were laid out, and each tenant compelled to build his house and offices on his own lot; the domestic animals were no longer permitted to occupy the same apartment with the man and his family, the pestiferous cesspool and the dung-heap no longer to occupy the front of the dwelling, but to be removed to a proper distance.

This new order of things caused at first great dissatisfaction amongst the people; somehow, in the redistribution of the land every one lost good land and no one got it—one man's house was better than another, and he did not like to part with it. Wicked words and threats ensued; but his Lordship was firm—he had taken measures for their good. A well considered system of compensating rules was adopted, by which none could gain at the expense of his neighbour. After much vexation and opposition one townland was commenced and put in order, and soon followed by another, with the most happy results. The benefits were so apparent and approved of, that, instead of opposition, the occupants of townland after townland came in and begged to have theirs "striped," as it was termed. New dwellings, of a superior but not costly description, appeared in every direction; the stable, cow-house, pigsty, and barn followed; divisional fences were soon erected; turnip, mangold, clover, ryegrass, and vetch seeds

purchased at wholesale prices, and
at cost price to some, and to the smaller
ore necessitous gratuitously. It must
: supposed that this mighty social re-
on was effected without some vexations,
e old leaven was still secretly at work;
ord Arran had "nailed his colours to
ast, pursued his course undeviatingly,
rose superior to every device of the
ion enemy." He appointed two re-
ible agriculturists to reside on the estate
: on the southern, the other on the
ern division—whose duty it was to
ct and advise the tenants in the best
nost profitable systems of husbandry.
holdings are small, ranging from 3
upwards; the steadings are complete,
t on the more recently taken up town-
—for it is only those which fall out of
asp of the middleman that his Lordship
leal with; the houses are beautifully
and comfortable, well lighted, and both
s and offices nicely whitewashed inside
utside; the furniture clean and in good
tion, the bedsteads well made, boarded at
id three sides, and covered at the inside
ancy room-paper, and tastefully draped
: exposed side. All had ample stores
me-made linen, rivalling the snow in
ness, fancy linsey woolsey and frieze,
roduce of their own industry; so that
ad almost everything they required for
without buying, except shoes. Samples
his estate, amounting to nine different
s, in some cases from one family, were
ited at the Royal Dublin Society's
ition in 1865, and still remain there in
s case, as evidence of what can be done
: Irish peasantry when properly fostered
couraged.

consequence of the difficulty of procur-
od seeds, and true to name, these
e have been taught to grow their own
, mangold, parsnip, vetch, and grass
and the samples produced are, for
, maturity, and quality fully equal to
ported. But the improvements effected
h the cottages and the land are as
g compared with the social regenera-
nd independent spirit of the people.
When Lord Arran first came amongst them it was disgusting to his mind to see them follow him in crowds, fall prostrate before him, grovel in the mire, kiss his boots, his hands, and garments; he has now, by his treating them as human beings, infused so much of his own independent spirit amongst his people that he can walk through his estates without any man wasting his time to follow or do anything more than respectfully saluting him.

In former times, when misrule reigned, those extensive estates were governed by absentee and local agents, with a dozen of drivers or bailiffs at their heels, who fleeced the tenants unsparingly. The district pounds were seldom unoccupied at any time throughout the year by the defaulting tenant's live stock. All these cormorants have long since been sent to the right-about, and a respectable high-principled resident agent appointed to second his principal's views. There are no bailiffs or drivers on the estate; there is no longer any use for pounds. Formerly the tenants were from two to five years' rent in arrear; now the rents are regularly paid up, and little or no arrears, and many with money in the bank; and we have no doubt similar results would follow the same humanizing treatment of the poor ignorant tenants on other estates. But, it will be asked, what has all this improved state of things cost? In reply, we say, with the exception of his own personal exertions, the cost of surveys, the stipends of the agriculturists, and some assistance in road making and draining, these stupendous improvements, and the quietness and content they have conferred, have cost his Lordship nothing.

The designs and erections are his and his *employés*, but they have been worked out by the well-directed labour of the tenants themselves, whose willing minds and sinewy limbs succumbed to no toil, being assured that what they effected was exclusively for their own sole use and benefit. Such have been the benefits conferred by the Earl of Arran amongst his numerous tenantry, and have no doubt that, with similar means, the same results would follow in any other part of Ireland.

CULTIVATION BY STEAM POWER IN SCOTLAND.

IT has been remarked (says a well-informed and judicious writer in the *Aberdeen Journal*) that, in one department of their business, the farmers of the north, and especially of the north-east of Scotland, have shewn less than their usual intelligence and enterprise, namely, in the matter of employing steam, in place of horse power, for driving their thrashing machines. One reason commonly assigned for this is that the landlords will give no encouragement or assistance in erecting the necessary "fixtures," that is, houses, chimneys, &c. It is undoubtedly quite true that in this, as in other matters of improvement, everything, as a general rule, in this part of the country, has been left to the tenant. The reclamation of land, drainage, and even the building of houses, for the most part, during the last forty or fifty years, have been accomplished by him, or at his expense. Nevertheless, within the last six or eight years, rapid progress has been made —either with or without the assistance of proprietors—in substituting fixed steam engines for horse power on the larger and medium sized farms throughout the country.

But steam power has now taken its place as a recognized agent in other departments of agriculture besides that of thrashing. Many of us can look back to the time—not, indeed, very many years ago—when the proposal of ploughing our fields by steam power would have been received by most men with a smile of incredulity. We now, with little surprise, hear of, and some of us have seen, a field ploughed, or, better still, "cultivated" or "smashed up," by steam power, at the rate of some 30 or 40 acres a-day. It is true that in this part of the country the character of our soils, and the uneven surface on which they very generally repose, do not afford the same facilities for steam cultivation as are afforded by the comparatively level clay lands of the south. Nevertheless, such is the state of advancement to which the machinery and implements for steam cultivation have now been brought, that we submit whether the time has not arrived for the farmers (and, might we not add, the landed proprietors?) of the north of Scotland, to consider the propriety of availing themselves of this new agency for the cultivation of their fields. It is needless to remark that there are some districts of the part of the country now referred to, which afford greater facilities for steam cultivation than others; and it is in such districts, moreover, that the aid of the steam engine is most needed and most likely to prove advantageous. Such is the case with the clay lands along some parts of the coast and elsewhere.

Every one is aware that the plan or method by which steam cultivation has, for the present, been generally carried into effect, is by the agency of a steel wire-rope, which is attached to the cultivating implement, and coiled and uncoiled upon barrels or "drums," driven at a slow rate by the power of a steam engine. We confess that, along with many others, we had at one time rather a prejudice against this apparently somewhat cumbrous plan, and entertained a hope that a simpler and more direct method of working might be devised. Such, however, has not been the case; for the experience of Lord Dunmore and some others in the use of Thomson's "road steamer" for cultivation, is as yet too limited to enable us to decide whether the plan of carrying a heavy steam engine over the land along with the cultivating implement, will be found preferable to the wire-rope method of traction. There are, moreover, certain obvious and important advantages which attend this latter plan, especially on clay land in a soft condition, and on sloping and uneven surfaces; and the necessary apparatus for carrying it into effect has

been considerably simplified and rendered highly efficient by the mechanical skill and ingenuity which have been brought to bear upon it during the practical experience of the last six or eight years.

There are four systems, as they have been called, on which this wire-rope method of steam cultivation has been, and is at present, carried into practical operation :—

1. By means of a traction or self-moving steam engine with a winding drum for the wire-rope, moving along the headland or the bottom of the field, as the case may be, as the work proceeds. At the opposite end of the field is placed either (1) another self-moving engine of the same power, and with a winding drum; or (2) a moveable disc-anchor round a large pulley on which the wire-rope is made to pass. The cultivating implement is drawn to and fro between the two engines, or between the engine and anchor, by coiling either portion of the rope around the winding drum or drums. The wire-rope is borne up and prevented from trailing along the ground by self-adjusting rope-porters. When two winding engines are used on opposite headlands, they are alternately employed in drawing the implement, and in paying out the rope, and at the same time moving into position for the return "bout." This is called the double-engine system, and is employed where such a large amount of work has to be accomplished (the fields also being large and the surface comparatively level) as to justify an investment of capital to the amount of from £1400 to £1700, according to the power (usually from 12 to 20-horse power) of the engines used. It is undoubtedly the most efficient, and in certain respects, the simplest method of working; and by means of it some 30 or 40 acres may be cultivated in a-day. In actual practice, however, we generally find the amount of work done considerably less. When a self-moving disc-anchor is used at one end of the field, the expense of the whole is reduced to about one-half of the above, or say, £700 to £800—that is, for the engine and tackle, apart from the cultivating implements. These latter—namely, a balance plough and cultivator—cost from £150 to £170.

2. The traction engine may be provided with two winding drums, in which case it may be used with an anchor at the opposite end of the field as above, both being made to move along the headlands as the work proceeds; or, the engine may remain stationary at a corner of the field or elsewhere upon, or adjacent to, the field, while only the anchors and snatch-blocks move as the work proceeds. In the latter case, the rope is carried round either the whole field or a portion of it, by means of stationary anchors, "snatch-blocks," &c. The advantages of this system are that it avoids the necessity of the engine travelling along the headland, or even being taken upon the field when circumstances—such as hilly ground, irregular fences, or the wet condition of the soil—render that undesirable or impracticable, while, at the same time, the engine is available for direct traction from the implement when circumstances permit it.

At the last meeting and competition (in July last) of the Royal Agricultural Society of England, Lord Vernon's prize of £100 offered for the "best traction engine and tackle for steam cultivation, at a price not exceeding £700" (the engine to be applicable to other purposes on the farm, such as thrashing, &c.), was awarded to an 8-horse power, single cylinder traction engine, "with self-moving and reversing gear, and with double speed and steel gearing on road motion, two winding drums, having self-acting coiling gear, &c.," costing £490. The other necessary apparatus, namely, disc-anchor, 1200 yards of hard steel rope, filled with eyes, 10 large and 10 small rope-porters, with other extra parts required when working the engine stationary, brought up the price of the whole to £698. This does not, however, include the cultivating implements. These, namely, a three-furrow balance plough, and a five-tine turning cultivator, would involve an additional outlay of £125, making altogether £823.

On either of the above systems, it will be observed that the engine or engines must not only of necessity be traction or locomotive, but they must have the winding drum or

drums, with the necessary gearing for working the same, attached to their frame-work. When used for thrashing, or other such purposes, they must be encumbered with this apparatus. But this may be avoided; for,

3. The winding drums, with the necessary gearing for converting the comparatively rapid motion of the engine into the slow motion of the plough or cultivator, may be placed upon a separate frame-work, and mounted upon two or more wheels. This piece of apparatus is called a "windlass;" and much ingenuity and mechanical skill have been employed in bringing it to its present state—we will not say of perfection, but—of efficiency. The motion may be conveyed to it from the steam engine either by a tumbling shaft with universal joints, or by means of a belt from the fly-wheel in the usual way; but, in either case, it must be stationed alongside of or near the engine. But we have here this important difference, that the engine by which the windlass is thus actuated, may be not necessarily a traction or locomotive engine, but a common portable engine, such as has hitherto been used for driving portable thrashing machines in this part of the country. This admits of a reduction of from £200 to £300 in the expense of the whole tackle, accompanied, of course, by the disadvantage that the engine and windlass, with all the necessary apparatus, have to be transported from field to field, or from one farm to another, by horse-power. The length of wire rope required is also somewhat greater, but the difference of expense on that head is not material. On this system, the engine, whether portable or locomotive, is placed, say, at a corner of the field—outside the field or within it—with the windlass by its side. The wire-rope passes from one of the drums of the windlass along the headland to an anchored snatch-block, stationed for the time at a point in the line of furrow along which the plough or cultivator is working; carried round a pulley on this snatch-block, it passes down the field to the implement, and (supposing that the implement is for the time being drawn towards the snatch-block just mentioned) the "tail-rope," as it is for the time called, passes along the remaining length of the field, and round another anchored snatch-block on the opposite headland, along which it is carried to a third snatch-block placed at the corner of the field; carried round this, the rope then passes along the length of the field again (borne on the necessary rope-porters) to the corner at which the engine is stationed; and passing round a fourth snatch-block there, it returns to the winding drum of the windlass. It will be apparent that the first and second of these snatch-blocks have to be moved forward step by step along the headlands as the work advances, while (by the alternate action of the windlass drums) the implement is drawn to and fro between them. We have mentioned only four snatch-blocks; but very commonly five will be necessary, and, in cases of irregular boundaries, six or seven may be requisite. This is called the "round-about" system. It is, for the reason already indicated, the cheapest, or at least cheaper than either of the other two already referred to—that is, in so far as the expense of the necessary "plant" is concerned; and, on the whole, it is perhaps the most suitable where the fields are small, and the amount of work required to be done comparatively limited.

The whole tackle, including implements necessary for working on this system, is thus enumerated:—"Patent windlass, with compensating brake and universal joint; 1900 yards of steel wire-rope; combined 3-furrow plough, and 5-tined cultivator; seven snatch-blocks and claw anchors complete; four fixed anchors; twenty rope-porters; with the necessary levers, crowbars, mallets and chains;" and the price of the whole is stated at £250. To that sum we have, of course, to add the price of, say, an 8-horse power portable engine—£210, or, if we say a 10-horse power engine, which would be preferable, £240, making altogether, for the whole plant, £490.

It thus appears that a few farmers in a district—if they could command or hire the temporary service of a common portable steam engine of sufficient power used for thrashing—might commence the work of

cultivation at an expense for the neces- ckle and implements, of £250, which, e were, say five of them, would be an ment of only £50 each. If such a ıny found themselves in a position to ıse an engine also, then, we would ly recommend that an "agricultural otive" or traction engine, should be ı, such as Fowler & Co.'s, or Aveling rter's, which would cost for 8-horse £360, or 10-horse power, £420. Such an engine, capable of travelling about the country from place to place, and taking its ploughing tackle or thrashing machine along with it, could not fail, we apprehend, to pay for the investment, provided anything like a fair amount of work could be obtained for it; and, we must add, provided it were placed in charge of a careful and intelligent man. It would be well, indeed, that the party in charge of it should have some considerable pecuniary interest in the concern.

THE HEADS OF SHOW ANIMALS.

/E abridge the following article from the new number of the Bath and of England Society's *Journal*. It is the pen of Mr Henry Corbet:—

a dinner-table one evening at the ers' Club, a discussion incidentally as to the chief points to be taken into con- ıtion in judging an animal, when there very unanimous opinion in favour of ; and shoulders. Narrowing the argu- again, to any one particular point to ', there was a clear majority amongst the -dozen or so of us, who joined in the ersation, in favour of heads. The der, no doubt, answers very much for and symmetry and frame, but the answers for everything. If you go for l, you look above all to the head; if aim be style or fashion, you must seek in the head, as nine times in ten that accommodating phrase known as quality ld prove itself by a good head. You t the very purpose of an animal by a at his head. The calm placid counte- e of a naturally thriving beast; the noble, uline, well-defined features of a sire of character; the several uses of the horse, ıstincts of the dog, and the mere gluttony e pig, how safely you may arrive at the lusion by studying the head! A scale oints for one or two certain breeds has dy been drawn out; but in none of these is sufficient importance, at least as I am led to think, attached to the head of an animal, as the main index to his purity of blood, strength of constitution, and actual fitness for that service for which it is intended. Who would take to himself a bull with a mean, delicate, "cowy" head? And yet I have seen such distinguished in a Royal show-ring. Or, who would crave for his own riding, the sour-visaged, vicious-eyed hack? Or care to breed, or try to breed from the steery-looking heifer, which has lost the very semblance of her sex, from the misdirected zeal employed in feeding her up for show? A man may save himself a deal of money trouble, and disappointment, by making the head a first principle in establishing a flock.

The head of a shorthorn bull should be broad and moderately lengthy, with a full open countenance, a large prominent eye, and plenty of width between the horns, where there should be a good covering of hair. The horns themselves must be strong and slightly backward, with a very gentle inclination upwards, positively upright horns being the worst of all kinds. From being broad above, the head should taper gradually towards the nose, but not too decisively, as nothing is worse than a bull with an "egg-sucking" frontispiece, as a houndsman would say; and the muzzle itself should be of a clear cream or flesh-colour.

But the perfection of the improved shorthorn's head is to be found in the female. The very expression, so calm, so sweet, and so dignified, is of itself a delightful "study;" and when old Homer, in the way of compliment, applied so continually the epithet, *bo-opis*, or ox-eyed, to his matron goddess, he must have drawn upon the future, and have pictured to himself the noble, self-assured, full-blown beauty of one of our modern Duchesses. The horns of the shorthorn cow should be slightly curved and spreading, bright and clear in complexion, with a bronze tapering tip; the nostrils wide, with the ears large, and fringed with that fine delicate hair "only to be found," according to an enthusiast, "on a pure-bred shorthorn." Still, good though the head may be, this loses nearly all its fascination if it be not properly set on. It should run elegantly into the somewhat full, firm neck, with plenty of play and style in its carriage. Any animal which droops its head in a half-guilty, hang-dog fashion, can never show to advantage.

Early maturity or quick feeding is the chief recommendation of a shorthorn; and so when we look one in the face we must bear in mind that what we want is, as Mr Carr puts it, "a placidity and composure of mind, a phlegmatic disposition, suggestive of fattening prospensity." In fact, a frisky shorthorn should be something of an anomaly.

Not so the Devon. I should myself have a fancy for a certain wildness or boldness in the head of a pure North Devon; and when Captain Davy says this should in many points resemble the head of the deer, he seems to me to have very happily illustrated his subject. With such a description, apt to my hand, it would be worse than idle to attempt any other than that I have from Captain Davy—"The head should be small, with a broad indented forehead, tapering considerably towards the nostrils; the nose of a creamy white; the jaws clean, and free from flesh; the eye bright, lively, and prominent, encircled by a deep orange-coloured ring; the ears thin; the horns of the cow long, spreading, and gracefully turned up, tapering towards the ends; in fact, the general aspect of the head should in many points resemble that of the deer. At the same time, the expression must be gentle and intelligent. The horns of the bull are thicker set and more slightly curved, or in some instances standing out nearly square, with only a slight inclination upwards. Fault has been found with the length of the horn of the Devon as being disproportionate, and we have been recommended to get them more like those of the shorthorn; but I hope, and indeed feel sure, that our breeders will never consent to give up one of the characteristics of their breed."

A well-known judge and breeder tells me that, beyond the colour of the face, and the length and straightness of the horn, the good points in a Hereford bull's head cannot differ much from those to be appreciated in other breeds. While, however, the horn of the bull runs straight and level from the poll, those of the cow and ox gradually curve upwards. The eye of the male should be rather lively than otherwise, and that of the cow conveying precisely the same calm, comfortable, good-tempered look which I have already identified with the shorthorn. The eye should be of a beautiful clean white in colour, backed by a rich red, more especially in the bull; the horn also white or light yellow, occasionally tipped with black, and the nose white; although here, again, we have the evil of black noses, which come, it is said, more frequently in Herefords than in any other breed of cattle. The head should certainly not be small in proportion to the other parts, as, in fact, a head either large or small out of proportion is simply a deformity in any animal. A really good head must have a certain length and breadth, to which such a phrase as small can never reach.

One of the kindest heads I ever saw on a Hereford cow was that of Stately 2d, the property of Mr Evans, of Swanstone, though she never did quite so well in public as might have been expected; but

> "If to her share some trifling errors fall,
> Look in her face and you'll forget them all."

The champion Hereford bull of his day, on the contrary, begins with a somewhat

mean, small head; whereas there should be something very noble in the head of a white-face, when seen at his best.

There is no animal which tells more of high breeding than an Alderney, or rather a Jersey-born cow. There is a refined air and carriage, a certain comely "presence," which would forbid all thoughts of the butcher, and never carry one's appetite beyond a syllabub on thin bread-and-butter. Beyond a peculiar, wild, wicked eye, there is not much to admire in the head of an Alderney bull, and even the cows lose much of their graceful character when bred away from their native isle. In the Jersey scale of thirty-six points for a perfect cow or heifer, one each is allowed for the following excellencies:—"Head small, fine, and tapering; cheek small; throat clean; muzzle fine; and encircled by a light colour; nostrils high and open; horns smooth, crumpled, not too thick at base, and tapering; ears small and thin (one point), of a deep orange colour within (one point); eye full and placid." The eye of the bull must be lively and his horn tipped with black, but beyond these the points are much the same. The Jersey Society goes on to distribute the other points over the back, the barrel, legs, and so forth; but if we put down fifteen points for the head, and ten for the udder, leaving the other eleven for general appearance, we should arrive at a tolerably accurate, if not so elaborate, an estimate of an Alderney, which, after all, you must judge mainly fore and aft. I cannot believe in any man entering a ring with a pencil in his hand and carefully entering one point for this, and another for that, until he had proved a very pretty little sum in simple addition. He would surely "bother" himself during that somewhat tedious process.

Mr M'Combie, again, speaking of course of his much beloved black Polls, says:—"A perfect breeding of feeding animal should have a fine expression of countenance; I could point it out, but it is difficult to describe upon paper. It should be mild, serene, and expressive. He should have a small, well put-on head, prominent eye, with a clean muzzle. Thick legs, thick tails, sunken eyes, and deep necks, with thick skin and bristly hair, always point to sluggish feeders."

Let us look to another kind of Scotch cattle, and what would the West Highlander be without his head? The butcher will say in answer—"the very best beef"—but with his head all his character is gone. There is a wild grandeur, I had almost said majesty, about the head of the Highlander, that should count up very fast in any scale of his points, as perhaps no other animal shews in this respect such insignia of nature's nobility. You may read of his Highland home in his clear bright eye, his magnificent horn, and his rough, but right royal coat. And the southron would seem to have a deal still to learn in this way, for at the Smithfield Club Show of 1869, the judges selected as the best Highland ox, an animal with an ugly "cowy" half-Ayrshire head, that was no doubt a mongrel, and a new class had straightway to be instituted, in order to avoid such awkward "findings" for the future.

I am inclined to doubt whether the antients could really have had any correct idea of what a horse's head should be, from the very name which Alexander the Great gave his almost equally renowned charger, Bucephalus—a composition of two Greek words, *bous* and *kephalos*, that is, the head of a bull; just about the worst kind of a head a horse could have. We see this repeated, however, at a later period in the animal on which the knights of the tourney were mounted, where the same thick, broad bull's head is very commonly the type. But a man in armour was of course a great weight, and his war-steed probably more of a heavy draught-horse than the stamp upon which we now see a dragoon officer. In fact, the modern charger, the hack, and the hunter, must all shew breed; and let me thus endeavour to sketch the head of a well-bred horse, as it should be. The size of this must be in just proportion to the body, as certainly not noticeably small, but of a happy medium in length and breadth. Indeed, a horse's frame should "prove" by his head. The ears should be long, somewhat thin, and moderately open

and not set too wide apart, nor pricked up, but rather with a gentle inclination at the points towards each other. There is scarcely a movement of the ears but which has its meaning, and on this our barbarian ancestors improved by cutting them off! A lop-ear is assumed to indicate coarseness of breeding and sourness of temper, but this is not invariably the case. I have seen some thoroughbred horses with lop-ears; and Oulston, who carries his very drooping, is, in other respects, a horse of particularly bloody like appearance. Beginning, then, with the lengthy, flexible ear, the horse's forehead should be broad, bold, and gradually expanding in width from the poll to between the eyes, which should be set in the head a-third of its entire length from the poll. Nothing has a worse effect than the eye of the horse being set up too high in his head. And the eye of the horse is, of course, one of his great beauties, or one of the chief tests of his worth. Dark, bright, and lively, it should be a combination of spirit, sagacity, and gentleness, as, in fact, the eye of a gentleman. Especially to be avoided is the small, sunken pig's eye, which tells of everything that is bad.

To proceed, the face from the forehead should be rather round—not exactly bulging like the Gohannas—gradually reaching to a slight dip between the eyes and the nostrils, and then rising and falling again before coming to the nose. The nostrils should be square and open, with a sharp angular look about them that gives a certain peculiar grandness and force to the face. It is the expression of the horse's countenance which constitutes his chief charm, and there are many sober-headed horses who, without being handsome, shew this all but speaking intelligence in a very remarkable degree. The jowl should have a sweep from the root of the ear, with a good depth and a width of channel, tapering gradually to the muzzle. The lip, another sure sign of blood, should be thin, firm, and of moderate length, as the pendulous thick lip is unsightly in itself, and a tell-tale of bad breeding. A fat or fleshy head cannot, of course, be ornamental to either man or beast, and, as every man could see "no merit in a very prominent eye;" he rather "admires a tolerably full, one has his own fancy, mine is for a longish, lean head on a horse; how many good nags have I known with that serious, almost judicial cast of countenance?

If we go by heads, indisputably the highest, bred looking sheep are still the two breeds to which most of the other sorts trace something of their excellence. I refer, of course, to the Southdown and the Leicester, either in its way of a very patrician type. Next only, indeed, to the thoroughbred horse or the Jersey cow, there is not an animal on the show ground which carries more style and "stamp" on his countenance than the Southdown. Moreover, to see him at his best, you must bring him straight up from the Sussex Downs. The best bred sheep in appearance at this present time are surely to be found in the Duke of Richmond's flock; and no man could safely go further in improving the Southdown than the justly-celebrated Mr John Ellman of Glynde. It is to his standard that we must look if we wish to work on right principles, as it is to him I shall turn for the definition, although he begins with a statement which cannot be passed without comment—"The smallness of a sheep's head is an indication of its being well-bred." There is nothing neater than the head of a Southdown; but, as a rule, a very small head is objectionable in any animal, more particularly a male, and that capital judge of a sheep, Mr Henry Lugar, confirms me in this opinion—"The head of a Southdown," as he writes to me, "may be too small, and if the sheep be kept on for breeding purposes, delicacy will, in time, be the result." Mr Ellman's description runs on thus:—"The head should be neither too long nor too short, the lips thin, and the space between the nose and the eyes should be rather thin;" but, as Mr Lugar adds, "a little wider just above the nostrils than nearer the eyes." Ellman, in continuation, says, "The under jaw or chap ought to be fine and thin, the ears tolerably wide, well covered with wool, and not too thin;" while, according to Mr Lugar, they should be "of a fair length, standing well up, but not prick-eared." Ell-

bright-looking eye, but the eyecup or bone should not project," for the reason, as he gives it, that the ewes would have more difficulty in lambing. In so sharp a sheep as the Southdown, the eye of the ram should be lively, if not somewhat bold, in contradistinction to that placid gaze which men so covet in some other breeds of stock. Ellman concludes his description by stating that "sheep should be well covered with wool on the forehead, and especially between the ears, as it is a great protection against the fly." Noticeably enough, this authority, who flourished about the beginning of the present century, says nothing of the colour of a Southdown's face —a point which fanciers now often look to before any other, as one which breeders cannot always maintain. I have seen Southdowns exhibited but a few years since, from a very famous flock, nearly as light in their countenances as Leicesters, and I have heard of others getting their lambs as dark as Hampshires. The happy medium or proper tint is a beautiful mouse colour, in admirable keeping with the structure of the head and the texture of the wool.

The head of a Shropshire ram should be black; but this colour should not extend to the wool on the neck. In size, the head should not be too small or effeminate, with a bold, broad, but not coarse forehead, full eyes, and tolerably prominent ears, self coloured, but not mottled. The ear, although not so long as to be remarkable, should not be so short as to be hidden by the wool, which should come well up round the back of the head and ears, with a tendency to cover the top of the head. The nostrils must be fairly expanded, but there should be no inclination to bareness about the ridge of the nose nor between the nostril and eye—any such want of covering being very objectionable, and never to be noticed in a ram of any repute. There is altogether a strength and force about the head of a true Shropshire that should never be disregarded when looking at such sheep. The wool of the Shropshire should be close in texture, and not inclined to curl.

Any study of the heads of cross-bred animals or newly-established breeds is not so satisfactory in the way of a test, as the flock-masters themselves seem scarcely to have agreed as to precisely what they should go for. The subjoined synopsis of the head of an Oxfordshire Down ram may consequently not accord with the views of all, but it reads to me as a very good type to aim at. It should be long and tapering, with a forehead not too broad, but sufficiently so to give a good masculine expression, with a full bold eye, and ears well set back—that is, not too near the eyes. The poll must be well covered with wool, adorned with an ample top-knot on the forehead, and the face of a nice dark colour, between a jet black and a fawn.

There is something very taking in the clean finely cut features of a Leicester, over whose head those two great men—Bakewell and Ellman—agreed to differ. The long-wool man considered the prominent eye in a sheep an indication of good breeding, whereas the other "could see no merit in a very prominent eye." The face should be rather long, as denoting size, but should be shortened in effect by a broad indented forehead. The bridge of the nose should be somewhat broad and arched, or Roman-nosed, with wide open nostrils of a jet black in colour. The ears, of a fair length, should occupy a prominent position on the head, not too low, nor set very far apart: and the "high-quality" well-placed ear of the Leicester is a very safe sign of his purity. The ears and the head should be covered with beautiful silky wool—another proof of good breeding; while there must be a peculiarly delicate tint of blue visible just beneath the wool on the head, as in fact your true Leicester is as proud of his blue blood as a Spanish hidalgo. The Leicester head should be especially bare and quite free from wool of any strength, the expression somewhat sedate, but of marked character in the ram, and his head set on rather bold and lofty, in preference to the low drooping carriage which, at one period in his history, was considered to be "the proper thing."

It is sufficiently suggestive to find that the breeders of Border Leicesters have a positive

horror of the blue cast, a fact which of itself goes far to shew that this variety of sheep has come from a cross, most probably with the Cheviot. The borderer, indeed, lacks much of the aristocrat in his appearance, so noticeable in the English Leicester of older pedigree. The head is longer and not so refined, the neck thin and weak; and, though the Border may by this time be perhaps ranked as a breed of itself, there is not much to go by in his frontispiece. He hardly looks as if he ever had a grandfather.

I wish we could see more at the West of England Meetings of a far more antient family, which should furnish one of the leading sections of the show. I, of course, refer to the grand towering Cotswolds, of which Mr Well, of Hampnett, writing many years since, says:—"The head should be long and thin, the ears rather wide and not too thin, having no wool, but a tuft on the poll;" whilst I am indebted to Mr Robert Garne, of Aldsworth, for a better and more elaborate reading of a Cotswold countenance. The head should be wide between the eyes, and the eye itself full, dark, and prominent, but mild and kindly, and in no way coarse about the brow. The face should be proportionately wide to the space between the eyes, but not too flat, and should run off much the same width to the nostrils, which must be well expanded and somewhat broader than the face, with the skin on the nose of a dark colour. The cheek is full, and, as the face, well covered with white hair; a just perceptible blue tinge on the cheek and round the eye being rather "fancied." The ear, long but not heavy, of medium thickness, and covered with the same short soft hair, should be carried well up, while black spots on the point of the ear are not considered objectionable.

Of the other breeds, the improved Lincoln now looks to take much after the Leicester head, although coarser in its character; while the true Dorset, with his nicely curled horn, should have a white eye in harmony with the colour of his countenance, although the best sheep of last season shewed an eye as black as a sloe. As for the Scotch blackface, he is as handsome in his degree as the Highland beast, as he tells alike by his head of the wild country from which he springs.

Mr Fisher, of Carhead, in his scale of 110 points for a perfect pig, allows eight for the head. The head of the improved Berkshire, of course, is a different animal from the old-fashioned Berkshire or Hampshire hog, which should be something the shape of a cone, though not too pointed nor at all turned up at the nose, but short, straight, and deep; in fact, about as long as thick through, at a line to be taken from between the ears. There should be but little white about the face, if still with a sprinkling of lighter-coloured hair on the centre of the forehead, as well as on one or both eyes; whereas black markings on a white pig are not liked, and I have known very keen hands try to burn them out by show time.

IMPROVED DAIRY FARMS IN CHESHIRE.

ONE of the chief recommendations of the factory system of dairying is, according to the promoters of factories, that it does away with a great deal of the "slavery," as it is called, connected with the making of butter and cheese on the old plan. While we should much like to see the principles of co-operation in dairying tested on a wider scale than it has yet been in this country, we have pleasure in noticing that on some estates a better, a more commodious, and a more comfortable class of dairy homes are arising. Take the following, for instance, which we clip from the *Chester Chronicle*:—

One of the acknowledged points of super-

riority which a cheese factory possesses over an ordinary dairy, is in having at command all the best appliances invented for the manufacture of cheese. The circumstance is accidental, for we can imagine a factory got up in the old home-spun fashion which yet possesses the essential principal of co-operation, while on the other hand there are dairy premises to be seen—though they are not at present very numerous—where the facilities placed at the command of the tenant bear comparison with those generally deemed indispensable in a factory. Most of those on the estate of Mr John Tollemache, M.P., in this county, are of this latter kind. For many years now, that gentleman has taken the warmest practical interest in the household accommodation of his tenantry; and by a considerable expenditure of capital, has replaced the cramped and inconvenient dwellings which served as farm-houses, by large, and in every way commodious, blocks of buildings. These bright-looking red-brick erections are everywhere conspicuous features in the landscape about Beeston, Peckforton, and Calveley; their quaint gables shewing themselves in elevated spots which command ample views of the surrounding scenery, or peeping out from clumps of trees in more retiring fashion; the choice *parterres* of geraniums, lobelias, chrysanthemums, and verbenas, with which all of them are more or less fronted, adding no little to the neatness of their appearance. Inside one of these fine specimens of the English farm-house, there is no doubt that the skilled cheese-maker would enter upon a formidable competition with the most costly factory. All that he wants for his business operations he has immediately about him, with ample ventilation and complete protection from the weather. A strong argument of the promoters of the factory system is, that by resorting to it the farming population are relieved from much of the "dairy slavery" they have been subjected to for generations. The reproach is just; but no little share of the laborious work to which this name has been given, results from the rule-of-thumb system, which has been tenaciously persevered in, and the ill-contrived habitations in which the manufacture has been carried on. The plan of heating the whey in huge boilers to get "fleetings," for instance, caused a tremendous expenditure of physical strength, and, from the great heat which had to be maintained, almost certainly injured the health of the women regularly engaged in the work. It is now abandoned, and in most of Mr Tollemache's new buildings, slate cisterns have been erected capable of holding ample quantities of whey, where the method of cooling efficiently substitutes that of heating to which we have just referred, and by this simple alteration relieves the operators of all the severe exertion attendant upon the other process. The refuse whey is conveyed to the piggeries outside by a pipe running from the bottom of the cistern in the same way as at Tattenhall. The supplying of water for the various operations, again, used to be heavy work, as everybody knows how much scrubbing and cleaning has to be done in order to keep a dairy in a proper state. Here, however, a pump has been erected in each yard, connected with which are pipes running to every necessary part of the milk-house, so that the men on the farm, by work-ink at the pump occasionally, can provide sufficient water for daily use inside, the taps only having to be turned on in the same way as when the supply is derived from a Water Company's main. Ovens for keeping newly-made cheese at a high temperature in order to extract the remaining whey, have been constructed with the most careful regard to convenience, and the work of moving the cheese in and out is perfectly easy. Further to facilitate this lifting of the cheese after it has taken a solid form—a part of the work which used to be slavish enough—hoists have been put up between the press-room and the store-room, so that by the simple winding of a small crank, that operation is at once accomplished. We have heard of a stalwart dame who shewed her contempt for these machines by invariably carrying the cheese upstairs in her arms, though she had a hoist in the house; her reason being that while she was going up

wind the apparatus, she could do the whole business; but few even of our robust dairymaids have such an uncontrollable love for hard work as that. The store-rooms are of course ample in proportions, and sufficiently airy. Let us mention, too, that downstairs, where much of the work used to be performed in the open air, a zinc roof has been put up, which excludes the rain and moderates the heat. In every possible way, indeed, the comfort of the workers has been consulted, and the result is the banishment of a great deal of drudgery which used to be the invariable accompaniment of cheese-making. There has been much ingenuity expended in the rebuilding of these farm-houses, both by Mr Tollemache and his agent, Mr Cawley, and they might serve as no mean pattern for landlords equally inclined to do the best for their tenants. That the member for West Cheshire is so, one further illustration will shew. He does not preserve ground game, for the one reason, that he is conscientiously disinclined to encourage the breeding of animals who get their living on his neighbour's produce. Rabbits, of course, are entirely at the mercy of the tenants' guns. There would be an end of the game question very quickly if all landed proprietors were equally considerate.

TRAINING YOUNG HORSES HOW TO JUMP.

A CORRESPONDENT of the *Field*, who appears to have had a great deal of practice, thus writes :—

I have found the following plan safe and successful. Put on a cavesson, with a couple of lungeing reins joined, so as to leave plenty of room for your horse when he lands. Put up the irons, fasten the reins at their full length to the surcingle, and put a runner on to keep them up, so that the horse cannot put his legs through them; take the curb chain off and tighten the lip strap, so as to keep the bit in its place. The horse will then only feel the bridle when he bends, and will have nothing to check him as he jumps forward. Some men take their horses to jump with a cavesson alone. I have not found it answer, inasmuch as, if your horse refuses, you have but little command over him without a bridle.

To teach a young one well, several jumping places should be built up for the purpose. There should be a high siding of strong timber rails, forming an approach about 30 feet long to the fence, the first of which should be a common flake hurdle well tipped with gorse, and with a small trench or ditch on the taking-off side. At first the hurdle should be well sloped, so as to give the horse a better chance. Put a man on the landing side of the hurdle, ready to take the rein, and a man at the entrance of the approach to the jump, with a long lungeing whip ready to hand to you; *and be sure he "keeps his whip still."* Then send an old horse, one that will jump freely and well, with a good lad on. At the approach to the jump, keep your own horse outside, standing by his head, and making much of him, in such a position that he can see every movement of the old one. Let the lad ride the old horse quietly up and pass him over the fence two or three times. Then take the young one and walk him quietly up to within a length of the fence, pass the end of the lungeing rein to your man, and let him gather in the slack so as to have hold of his horse when he lands. Step back and take your whip. An encouraging word or two, and a light crack of the whip without hitting him, will send the horse over the fence. Be careful that the man on the off side does not stand in front, but at the side of the jump, and does not speak, for, if the horse is at all nervous, any noise on that side will stop him effectually. If he hesitates, and shews much nervousness, let your second

man head him up as often as the horse turns away; your presence in his rear and between the rails will prevent his turning round. And, if you keep him there all day, go firmly but quietly on with him till he does it.

Then let him go home at once, and don't ask him to do it a second time that day, for nothing so bullies and worries a young one as being brought back time after time to jump the same place. And it should never be forgotten that when you have taught your horse what is required of him, and he will jump even a small fence in cold blood, he will be sure to jump high enough and far enough when you take him out with hounds. I have found most young ones inclined to overdo it.

If you are short of space, you can vary the kind of fence in your jumping place from day to day, using clean timber, an artificial thorn fence with gorse and thorns drawn through a large sheep hurdle, and have a fair-sized trench dug on both sides. If the ground is hard, put down plenty of tan or anything available, to keep the shock from your horse's legs. Let him jump also in bandages well put on, and Yorkshire boots, and he cannot then hit or mark himself.

The more jumping places you have in a good-sized field, the better. I repeat you will avoid worrying your young one at the same place. After the second or third day you can ride him yourself at his jumps, if your weight will admit of it; if not, put up a lad who you are sure can sit on, for there is no worse lesson for a young one to learn than that of getting his rider down. It not only frightens him, but he recollects how he did it, and will try it again. Nothing but your weight should prevent your riding him yourself, because he will have more confidence in the feel of your hand and leg, and the sound of your voice, than in those of a stranger.

Keep the cavesson and lungeing rein on for the first attempt, and when you have him well over take off the cavesson, let your man follow you well up with the whip, and ride over without other assistance.

In a few days, save in exceptional cases, you will be able to canter him collectedly up to his jump, give him plenty of support, and let him take it in his stride without rushing or hurrying. You can then make some gaps in the natural fences, and, as you ride him about the land, take your old horse with you at first, and let the lad lead yours over the places you have prepared. From time to time you can place small flakes, or hurdles, with gorse in the gaps, and accustom your colt by degrees to jump these places without company.

Do not wait for cub hunting to let your horse see hounds. In the early mornings of summer and autumn some pack is sure to come your way, one day or other, in their exercise. Ascertain when they are coming, and go for a good long round with them. They don't go fast, so you will not rattle your horse's legs, while you will be able to keep him close to the pack for several hours, and he will be familiarized with the sight of the hounds, and therefore less excitable when the mud begins to fly.

The most difficult thing to teach a young one to do well is to jump water. With average opportunities, the owner of a promising young horse will be able to put up every kind of fence artificially that a horse is likely to meet in any country—timber, stone wall, ditch and bank (more *Hibernico*), doubles, or ordinary hedge fence. But it is not so easy to find a place where you can make such approaches to a water-jump as a horse cannot shirk. By the above term I do not mean 1½ foot depth of muddy water let into a dug-out hollow in a field, and having on the taking-off side a fair fence to make the horse rise. Such a place presents quite a different appearance to a young one from that of a brook with irregular and uneven banks, perhaps with 14 or 15 feet of water running noisily through it, and nothing to induce him to rise. The first-mentioned impediment is easily enough to construct. One sees them constantly on made steeplechase courses. But although you may use your cavesson and lungeing rein at such a place, it would be useless at the natural bro

It will do your horse no harm to teach h

to do an artificial water-jump well. It will give him a fair notion of doing the natural one, but it will not give him the pluck and the heart to do it. These can only be developed—for they must be innate—by the pluck and heart, joined to the good workmanship of the rider. In fact, I consider the man who can ride a young one fair and straight right into his bridle over a big water-jump, a finished artist in the saddle. It is the more difficult, because cleverness alone will not enable a horse to do it. If there is anything like 15 or 16 feet of water, he must go at a great pace; the faster the pace, the easier it is for him to refuse; and, as a man cannot have a hunting field all to himself, there is always risk of some plucky man's horse refusing in sight of the young one, which is a sore temptation to the juvenile to do the same thing.

When you come to the natural water-jump, then, the yawning brook, I confess all precept as to certainty ends. You are then far beyond the reach of the cavesson and lungeing rein. There is but one way. Be sure you do not attempt big water-jumps until your horse has seen a fair amount of other fencing. When you do attempt it, I know no better advice than that given to me some thirty years ago by a celebrated Leicestershire rough-rider, now defunct. "Dick," I said, "which is the way to get a horse over 16 feet of water?" "The first thing," replied the veteran, "is to make sure that your own heart is in the right place; then take fast hold of your horse by the head, and freshen his way until he is going about 20 miles an hour; fix your eye on a spot to take off from, and keep your horse's head straight to it; give him plenty of scope of rein to jump a long way, but ride him up to every mile of it; and he don't take hold of you, hit him with the spur. Most likely, if his heart is as good as your own, you will both get over safe."

There were so many *ifs* in this advice that I did not quite see my way, so I asked again. "But if this don't answer, Dick—and I suppose it won't with every horse—how am I to get over then?" Dick took his pipe out of his mouth, blew a huge cloud, and regarding me shrewdly, said, "Then you must get somebody to take you over in a boat." He was right; there is no such thing as making sure of jumping a lot of water in safety. But, if you cannot command success, you may deserve it, but riding with pluck and determination, and "throwing your heart over the other side."

Such education, however, as I have above alluded to in the jumping way, will assist you materially in nearly every case, except, indeed, the last mentioned; and when the crops are off the ground your pupil should be in form to be taken with hounds.

When cub hunting commences, select the points at first a good way from home. If your horse is at all excitable, the trot will steady him, and he should have sufficient heart by this time to stand a long, slow day. Do not put him at every big place you come across, but nurse him for better things. If at the covert side he is frothy and fretful, as some will be, keep him moving, and give him something else to do. Carefully watch his condition; for, if you overdo the as yet tender sinews and ligaments, or the delicate internal organs of your young one, you may create mischief which will be irreparable.

When regular hunting commences, start early to your meet, keep out of crowds, and take as little as possible out of your horse in his first season. One good thing in a day ought to be quite enough for any four-year-old, and a three-year-old ought never to have a hair turned on him if you hope to see him grow into shape or money two years afterwards. Unfortunately, one sees too many young ones ridden with hounds and perserved with when it is all out of them; and there is no wonder that so many consequently find their way to the block, knocked out of time by all sorts of premature infirmities in their fifth or sixth year, and sold for a song. Of course it is a bad wind that blows nobody good; the hard riders of young ones help to keep the London cab masters in well-bred screws.

Agricultural Engineering.

DOUBLE-FURROW TURNWREST PLOUGH, &c.

WE have often had occasion to call attention to the ploughs manufactured by Messrs Ransomes, Sims, & Head, of Ipswich, not only because of their success in the field, but also on account of the excellence of their design and beauty of finish.

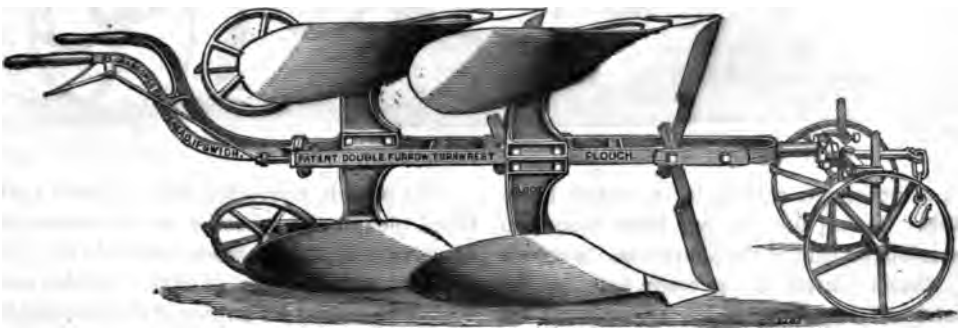


Fig. 1.

At the late show of the Royal, at Wolverhampton, they exhibited one or two *novelties*, of which we are enabled to give illustrations. Their new patent double-furrow turnwrest plough is represented in fig. 1, in its working position, and in fig. 2 thrown on its side for turning at the headlands. It is difficult to describe the action of turning without seeing the plough at work; but we may state that two small wheels are attached to the side of the beam (fig. 2), and when the throwing of the plough on its side has been accomplished by the ploughman, he releases the catch on the handles, which turn on the end of the beam, and gives a quarter-turn, which raises the other pair of bodies into turning position. He then requires to give the handles a further quarter-turn, which brings the plough into proper position for the return furrow. This plough is very suitable for light land, where no furrows are required to be left for carrying off surface water.

Fig. 2.

Messrs Ransomes have also introduced another novelty in the shape of a new patent double-furrow plough (fig. 3), which has an improved arrangement for lifting the plough out of work, and turning it in at the headlands. This is effected by a lever placed on the left-hand side of the plough, and a couple of wheels carried on a cross axle in the centre of the beam, which are lowered on reaching the end of the furrow; and by the ploughman pulling the lever towards him, the plough is lifted clear out of the soil, and [illegible]rne upon the two centre wheels, by means of which it can be turned either way with the greatest ease. It is also easily adjusted to plough any reasonable breadth or depth of furrow.

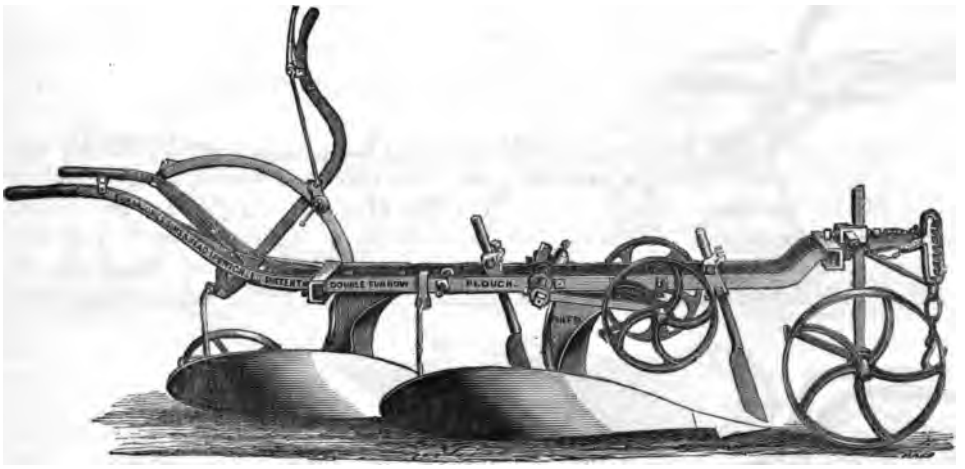


Fig. 3.

This plough, converted into a patent combined plough and subsoiler, is represented in fig. 4, as it appears at work; while in fig. 5, it is shewn as raised out of work, and the land wheels depressed for turning at the headlands.

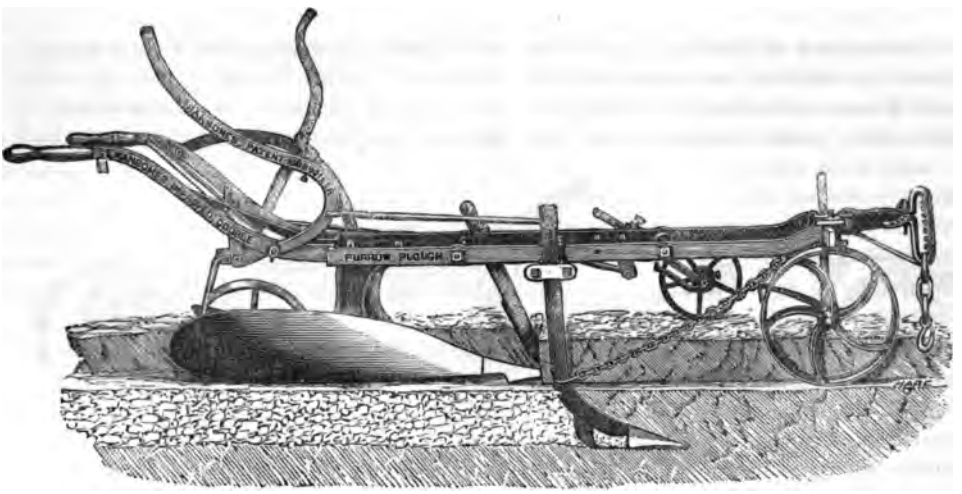


Fig. 4.

The lever at the right-hand side of the plough draws the subsoiler out of work, and whenever the ploughman again frees that lever, then the claw, shewn in the engraving under

bsoil tine, catches the ground, and the subsoiler into immediate action, it not only lessens the strain on the beam at any one point, but at the same time

Fig. 5.

same time tightening the chain, as n fig. 4. We consider the applica- this chain a radical improvement, as reduces the risk of breaking the tine should it chance to come in contact with an earth-fast stone.

SELF-ACTING CORN-SCREEN.

E energy and skill shewn in inventing ınd in making improvements in s of every description, for reducing .bour in every department of in- more especially in agriculture, has mething marvellous. Day after day ; of patents have passed the Great ›posing some new thing, or improve- ›on old. In many cases, these have ut failures after practical test. Other s have succumbed from want of carry out fully the invention, pro- ıen just on the eve of their succeed- ːrfecting it; while a third class, man- ving funds and thoroughly practical ːal knowledge, to produce a machine to the farmer and profitable to them- As a rule, inventors are always san- the great value and ultimate success ›wn creations; and with this we can find fault, as they are almost always the children of years of brain and manual work.

While wandering at "our own sweet will," after the heavier part of our duties had been finished in the implement yard of the Royal at Wolverhampton, we stumbled on a work- ing model of one of these labour-saving machines, in the shape of a new patent self- acting corn-screen, on the stand of Mr Robert Boby, of Bury St Edmunds, of which we thought a great deal. We have now the pleasure of giving an illustration, from which it will be at once gathered that the machine is not only ingenious but simple in its arrangements. It may be briefly des- scribed, with the help of the engraving, as consisting of an overshot wheel, placed in such a position that the grain, in passing from the hopper to the screen, causes it to revolve; and by means of this wheel, motion is given to the cleaning rollers between the wires of

the screen, keeping the spaces between the wires free from substances which would, if allowed to accumulate, render the screen useless. Being self-acting, one man can attend to it, as he only requires to fill the hopper placed at the top, and occasionally remove the screened grain from the bottom of the machine. Although we have not seen a full-sized machine at work, we do not hesitate to say, from what we saw of the working model, that it will do the work required of it effectually, and also come into general use not only by farmers, but also maltsters and millers, as it can be used as a hanging screen, the grain being supplied from the floor above.

Self-Acting Corn-Screen.

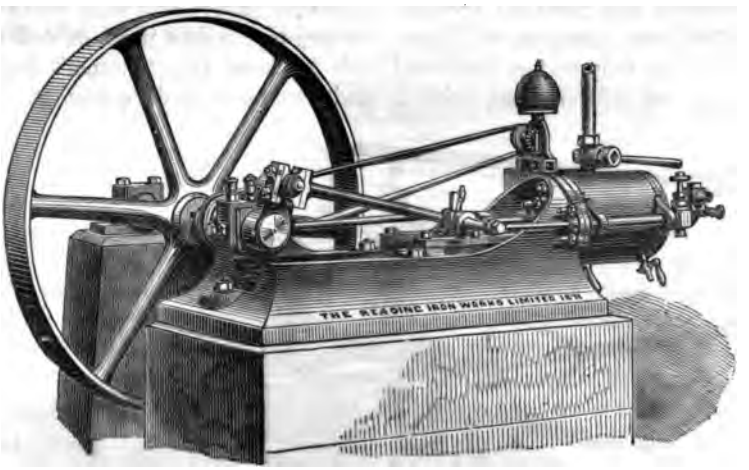
FIXED ENGINES.

HITHERTO a great drawback to the application of steam-power in connexion with the minor operations of the farm, has been the want of small engines at a moderate cost. Except on large farms, the expense of cost, and tear and wear of the ordinary sized engine, which must be of sufficient power for ploughing and thrashing purposes, is too great to have in daily use for crushing corn, cutting and pulping turnips, or chaffing straw. To reduce this expense to a minimum therefore, engines requiring less fuel have been much needed. This has been attempted by many makers; but we think that the one (of which we give an engraving) exhibited by the Reading Iron Works Company (Limited) at the Show of the Royal at Wolverhampton, comes nearest to what is wanted.

These engines require no masonry, and are provided with governor, feed pump, &c., also a turned fly-wheel, with room on the crank shaft for a driving pulley, should the fly-wheel be too large. While these engines are offered at an exceedingly low price, they are made from the best materials, and manufactured

the same care as the Company's larger l engines, for which they secured the prize at Oxford, and also at several of previous shows of the Royal.

Multitubular boilers are also supplied by the Company for these engines. They are of the most simple description, and have a large heating surface for each horse-power.



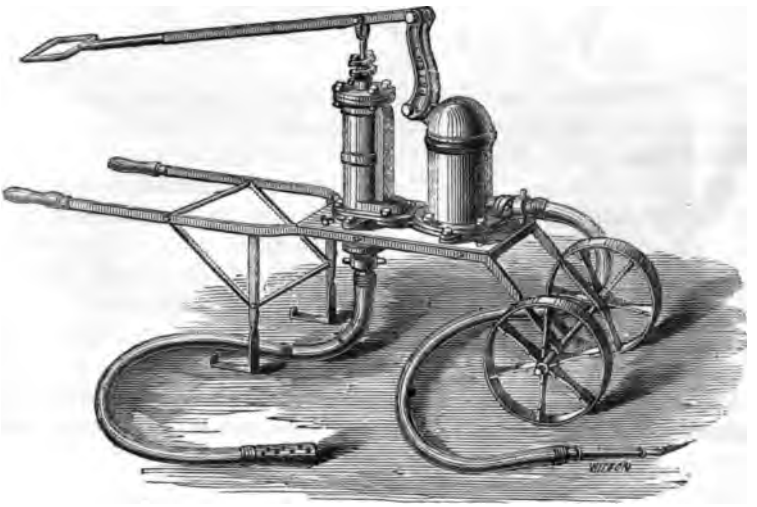
Fixed Engine.

FIRE ENGINES.

I has been said, and with truth, we think, "that he who makes two blades of ss grow where only one grew before, de- es well of his country," and we might that he who introduces an effective hine which will, in some measure at t, reduce the loss sustained by fires, ther in the farm-yard or elsewhere, is ally deserving of our thanks, if not to ething more substantial.

he loss that has occurred to farmers with- he last twelve months through fire, is ething appalling—traced, in some in- ces, to accident, in others to incendiarism, results in both cases being equally dis- ous. It is doubtless beyond the control ny one to avoid cases of fire, but it should necessity with all holders of property, ther insured or not, to have some pre- tion made to meet an emergency of the l, and we cannot do better than advise them to have a fire engine always in readiness. We are not insensible to remarks which will naturally be made by some of our readers, that it would be too much to expect that a single member of the community would be expected to purchase and uphold a fire engine; and we would have been quite of his opinion, had we not stumbled, at the Wolverhampton Show of the Royal, upon a number of small but most efficient engines on the stand of Messrs John Warner & Sons, of Cripplegate, London. We give an illustration of one named "Brookes' Fire Engine," the principles and details of construction being patented by Messrs Warner. It may be described as a double-action pump mounted on a strong wrought-iron barrow with a spacious air vessel and large free water-way, especially designed for use on farms as a good general purpose engine, the large water-way admitting of its being used as a force

pump for discharging or elevating liquid manure without the liability of becoming clogged or choked up. At the same time, it forms a most useful and powerful portable fire engine. Two men pumping will throw 30 gallons per minute fully 60 feet high, and with long length of delivery-hose, with a strong wrought-iron tub on four wheels, which can be used either with water (about 30 gallons) being placed in the tub, and a continual supply kept with buckets, or by a suction pipe from a pond or well near to it: this is called the "Farmer's Fire Engine," and can be worked by four or six men, it



Warner's "Brookes' Fire Engine."

spreader attached to the branch pipe, answers as a small irrigator.

Now, all this has been described supposing that the water could be supplied from a pond, well, or stream; but in some cases, where it is essential for expedition and safety to have the water near, and obtained at any emergency, Messrs Warner make, for this purpose, the same engine, a little larger in the working barrel, mounted on a having two handles, and will throw about 30 gallons per minute 70 feet high: it is compact, very simple, easily repaired, and is strong, durable, and moderate in price. We have entered thus minutely into a description of these machines, being specially worthy of the notice of farmers for their general utility, and more particularly on account of the probable saving to life and property by their more general use.

The Farm.

THE WHEAT CROP OF 1871.

R J. B. LAWES, of Rothamstead, has communicated the following esti- of the wheat crop of 1871 to the *Times*, we have pleasure in inserting, at his st, as it is an estimate that can be relied

very severe winter, a cold spring, and a excess of rain in June and July are seasons favourable for an abundant of wheat. It unfortunately happened, during a considerable portion of the l of intense cold, comparatively little fell; while, of that which did fall, was swept into the furrows, hollows, edges by the high east winds which led. In many fields the wheat plant, eprived of the protection of the snow, ther killed or very much injured. In of my fields the injury was strikingly ent on the side of the lands sloping ls the north and east. Tooke, in his ory of Prices," mentions the same thing urring in other severe winters. A cold and summer frequently follow a severe . The mean temperatures of May, and July were below the average this nd June and July were both very wet s. At Rothamstead, the rainfall ted to 3.86 in. in June, and to 4.0 in. , giving a total of 7.86 in. for the two s. which is 3 in. more than the total hich fell during those two months in ree preceding years taken together. eaping machine has, this year, been useless on much of the land on which ld otherwise have been employed, and abour has been unusually scarce. The t weather which prevailed throughout onth of August has, however, been of se service in drying the soil, drying and ripening the crop, and arresting blight and mildew. Although coming too late for the production of a full crop, the favourable change has enabled farmers generally to secure what there was in good condition.

The following table shews the produce of wheat by different manures in 1871, obtained in a field which has now grown wheat for twenty-eight years in succession. It also gives the produce on the same plots in each of the eight preceding years, there having been no change in the condition of the different plots as to manure during the last twenty years.

BUSHELS OF DRESSED CORN PER ACRE.

Harvests.	Without Manure Plot 3.	Farmyard Manure Plot 2.	Artificial Manure.			Means of Plots 7, 8, and 9.	Means of Plots. 3, 2, and 7, 8 and 9.
			Pt. 7	Pt. 8	Pt. 9		
1863	17¼	44	53⅜	55¾	55½	54⅞	38¼
1864	16½	40	43¾	49⅞	51	49	35⅞
1865	13¼	37⅛	40¾	43¾	44	42¾	31
1866	12⅛	32⅝	30	32⅛	32½	31½	25⅛
1867	8⅛	27½	22¼	30½	29⅛	27¼	21¼
1868	16⅝	41¼	39⅞	46½	47¾	44¾	34⅜
1869	14¼	38¾	28½	34¾	39	34⅛	28⅞
1870	15	36½	40½	45¼	45½	43¾	31¾
1871	9¼	39	22¼	27⅝	34⅜	28½	*25½
Av. of 20 years 1852-71	14⅝	35⅞	35¼	38⅜	36⅞	36¼	†29⅛

WHEAT PER BUSHEL OF DRESSED CORN (LB.).

1863	62.7	63.1	62.5	62.3	62.1	62.3	62.7
1864	62.0	62.5	63.1	63.5	62.6	63.1	62.5
1865	60.6	61.5	61.6	61.4	61.1	61.4	61.2
1866	61.3	61.7	61.0	60.1	60.6	60.6	61.2
1867	56.1	61.4	61.0	60.7	59.9	60.5	59.4
1868	61.0	61.6	61.1	62.0	61.1	61.4	61.3
1869	56.1	56.9	57.4	57.2	57.1	67.2	56.8
1870	61.7	63.4	63.3	63.7	62.7	63.2	62.8
1871	54.3	60.0	56.6	57.7	58.6	57.6	57.5
Av. of 20 years 1852-71	57.6	60.6	59.3	59.0	58.4	58.9	58.8

* Equal 24 bushels, at 61 lb. per bushel.

† Equal 28 bushels, at 61 lb. per bushel.

It is seen that, in 1871, the produce by farm-yard manure is considerably above, and that without manure, or from artificial manures, much below the average over twenty years under the same conditions as to manure. The characters of the season appear to have a far more marked influence, both for good and for evil, on the crops grown by artificial than on those grown by ordinary manure. Plot 2, with farm-yard manure, and plot 7, with artificial manure, give nearly the same average produce over twenty years. But, while the difference between the highest and lowest produce obtained over that period is with farm-yard manure, only 25 bushels, it is with the artificial manure, 31½ bushels; and, taking only the nine years referred to in the table, the difference is with farm-yard manure only 16½ bushels, and with the artificial manure, 31½ bushels.

Taking, as in former years, the mean of the produce without manure, of that by farm-yard manure, and of the three artificial manures taken as one, we get an average produce for 1871 of 25½ bushels. This is more than 6 bushels less than last year, and nearly 4 bushels less than the average of twenty years. As shewn in the lower part of the table, the average weight per bushel fluctuates very much from year to year. In order, therefore, to make the comparison more correct, it is necessary to assume a uniform weight per bushel. Adopting 61 lb. per bushel as the standard, the 25½ bushels at 57½ lb. per bushel will be reduced to 24 bushels of 61 lb. This is 4 bushels below the average produce of the last twenty years calculated in the same way; and the deficiency is equal to rather more than 14 per cent.

Before accepting the above result as indicating the probable average yield of the crop of 1871 throughout the United Kingdom, it will be well to take into consideration the amount of produce obtained in some cases of ordinary cultivation, and to compare them with the results obtained somewhat similarly in former years. The best portion of a field which had been summer-fallowed, and folded with sheep, has given 37¼ bushels per acre, and another field 33¼ bushels. Again, during the last few years a number of well known varieties of wheat have been grown at Rothamstead, the field and manure selected each year being such as it is considered should grow the fullest crop of the season. The following are the results obtained during the last three years with six of the varieties in question:—

BUSHELS OF DRESSED CORN PER ACRE.

Harvests.	No. 1. Red Wonder.	No. 2. Old Red Lammas.	No. 3 Bristol Red.	No. 4. Red Nursery.	No. 5. Woolly-ear White.	No. 6. White Chiddam.	Average.
1869	54¼	48⅛	54¾	49¼	52⅜	49⅝	51⅛
1870	51	48⅜	50	45	47⅜	45⅝	48
1871	31¼	31⅛	29⅜	34⅛	31¼	26⅛	30⅛
WEIGHT PER BUSHEL OF DRESSED CORN (LB.).							
1869	60¼	63	61	65	61½	60½	61⅞
1870	64¼	65¼	63¼	66⅞	64⅞	66⅜	65⅛
1871	59	62	60⅞	63	61⅛	62¼	61⅜

The deficiency of the produce of 1871, compared with that of the two preceding years, is, upon the whole, considerably greater in these cases than in those in which wheat has been grown for so many years in succession on the same land. In the latter, the crops stood up comparatively well against the storms of wind and rain in July, while every one of the twenty varieties grown together in an adjoining field was more or less laid, and some of them very much so.

In my letter on the wheat crop of 1870, published in your journal of August 26, last year, I estimated the average produce of the United Kingdom at 30 bushels per acre, and that it would require an importation of rather more than 7,500,000 qrs. to supply an average of 5½ bushels of wheat per head of the population. The actual quantity of imports, less exports, from September 1, 1870, to August 31, 1871, is, according to the returns, a little over 8,000,000 qrs. My estimate was founded upon the assumption that the average population of the United Kingdom requiring to be fed would amount to only 31,000,000, whereas the recent Census Returns shew that this figure was probably about 500,000 too low. Again, I took the number of acres under wheat in 1870 to be somewhat less than in 1869, but equal to

n 1868—viz., 3,937,275 acres; but, ling to the agricultural statistics since hed, this estimate of acreage for 1870 oo high by 163,612 acres, the actual er returned being 3,773,663. Adopting e harvest year September 1, 1870, to it 31, 1871, the increased number of opulation and the reduced area thus ted, the amount of wheat required to nported for the supply of the period l be rather over 8,500,000 qrs.

culated according to the Census Returns 71, the average number to be fed in the h Islands during the next twelve months e 31,843,970; and assuming the aver- onsumption to be 5¼ bushels per head, uantity of wheat required will be little of 22,000,000 qrs. Taking the home ce at 24 bushels per acre (of 61 lb. ushel), and the area under wheat to e same as returned for 1870—namely, ,663 acres—the gross produce of the d Kingdom will amount to about 6,667 qrs. Deducting from this 2¼ ls per acre for seed, we have left onsumption as food about 10,250,000 leaving a requirement of over o,000 qrs. to be supplied from foreign sources. How far this estimate is well founded time will shew. It may be that the wheat crop has suffered more in this than in the average of districts; but there can be little doubt that, at any rate, in many districts the yield will be below the estimate formed of it, and that disappointment will follow the test of thrashing. There are several circumstances pointing to a large consumption of bread during the coming harvest year. Meat is exceedingly dear; labour is in great demand, and full wages are paid. The potato disease has appeared in various districts, and although it is too early to form any estimate of its ravages, it is certain that the crop will not be plentiful. The information at present at command leaves no reason to fear that there will be any deficiency of foreign corn to supply our wants. But those wants will undoubtedly be large; and as France will require considerable quantities to supplement her own deficient crop, it is probable that the price of wheat will advance considerably before the spring of next year. In conclusion, I may remark that although my wheat crop is so deficient, both barley and oats are, on the same farm, unusually abundant.

THE STORING OF ROOT CROPS.

By Mr NEWBY FRASER.*

WITH regard to turnips, of course, it greatly depends upon how the far- ntends to consume them during the win- nd spring how he will store them; that ether they are to be consumed in the and sheds by cattle, or in the fields by). In my calculation, I have always en- oured as nearly as possible to consume hirds of my turnip crop upon the ground heep, the remaining one-third being n off the fields for the feeding of other : at the homestead; and my plan of storage has been as follows:—If the turnips are intended for hoggs, my plan has been to put them into pits containing about three cartloads each, in rows, covering them with a little straw, and above that a layer of 2 or 3 inches of soil, allowing an opening in the top of the pit for any air to escape through that may have been caused from heating, &c. For Swedish turnips that have been sown early, say in May, that have attained to their growth, and which are intended to be consumed by feeding hoggs, I have found no plan succeed so well as this, both for the safe keeping of the turnips, and also for ad-

* per read before Penrith Farmers' Club.

vantage to the hoggs themselves, as in average seasons they come out in February and March, clean, fresh, and dry, with not more than one dozen bad ones out of the three cartloads. If the turnips are later sown and have not arrived at full maturity, I have generally pulled two rows or drills at a time, placed them into a deep fur opened between the two rows by means of the plough, and the returning plough covers them in. By this method I have frequently known turnips add one-third to two-thirds bulk between 1st of December and 1st of March, in addition to which they are taken up sound, sweet, and fresh, with scarcely a rotten root amongst them; and another advantage is, that all cutting and poaching of the land in a wet November or December is thus entirely avoided. I have noticed many farmers simply allow the roots to remain in the field as they grow; run a double mould-board plough between the drills, with a strong deep hold, and thus throw a certain amount of earth around the plants, but this plan I have never adopted, nor do I approve of it, either in theory or practice. The two plans that I have adopted certainly came at the first to a little more expense and trouble, but I am inclined to think that eventually they are much the most profitable, and my idea is that the thing "worth doing at all is worth doing well." If the turnips are intended for consumption by aged sheep, such as two and three-year-old Cheviots or blackfaced wethers, old ewes, clipped hoggs, &c., I should not attempt to do anything with them at all, but merely allow them to remain in the field growing, and take their chance as to the character of the winter. I have never had any occasion to attempt the storeage of common turnips, having always contrived to get them consumed by Christmas at the latest by both cattle and sheep, so that the foregoing remarks must be taken as applying merely to the Swedish varieties. Next as to the storage of turnips intended to be drawn off the fields, and consumed by cattle; and here you will forgive me for saying that upon how the turnips are got out of the ground and stored depend in a great measure to the feeding of your cattle during winter. I maintain that all swede turnips intended for cattle feeding ought not to be sown later than the end of May, and pulled and stored not later than the 1st of December, in a clean, dry condition. I never saw anything more forcibly illustrated than this was last winter, for I had about 120 head of cattle tied up feeding for the butcher; the ground was in a wretched wet state during the latter part of November and early part of December, and, as a consequence, we were only enabled to get some 200 cartloads of turnips led, in a very middling state, by the middle of December, the remainder being hacked up at intervals as it was found practicable, the consequence being that my cattle did not thrive nearly so well as they otherwise would have done had the turnips been stored in a dry, clean state, but this was attributable entirely to the exceptional character of the season. In storing turnips for cattle-feeding, being well off for turnip houses, I have at the commencement of the season filled them as full as possible, and the remainder I have usually carted and put into long rows at some convenient and suitable place near the farm building, making each pit about 4½ feet wide at the bottom, and about the same height in the centre. When the turnips have been thrown up and placed in proper form, I have had them covered with a slight layer of straw, and above that some 2 or 3 inches of earth. In ordinary seasons, turnips keep very well in this way, and generally come out fresh and green. Another plan I have found succeed very well is that of measuring out a square, say 10 yards long by 10 yards broad, and throwing up the turnips, cartload by cartload, until they attained to an average and regular height of say 5 or 6 feet. When the heap is completed, they are left in a nice square, and by throwing on the top of the heap a covering of clean dry wheat straw, and above that 3 or 4 inches of manure, I found them keep well.

MANURES AND THE MANURE TRADE.

ENTLEMAN, whose pen, we believe, has frequently enriched our own , says:—

ring the thirty years which have elapsed the writer first called attention to uggestion thrown out by Liebig for eduction of phosphate of lime to the in which it is most readily available e nourishment of plants, the purchase pplication of phosphoric acid in a e condition (or "superphosphate," as cordance with the chemical nomencla- f the period, we ventured to call the ct in question), have undoubtedly d of immense advantage to the agri- ists of this country, more especially it portion of them who occupy land lly suited for the growth of turnips.

ere are two main reasons which nt for the fact that the employment of hemical process for the reduction of atural phosphates to a soluble condition oved of so much service to the farmer; because a supply of ready-acting phos- acid is not only of great value for oting the growth and development of of all kinds, but is of essential import- to the turnip plant in the earlier stages growth; and, second, because by the ss referred to, phosphoric acid from all es, animal or mineral—from which it e obtained—bones, coprolites, apatite, zed guano, &c., is equally available for rposes of the farmer. But though the r has certainly found his advantage rchasing and using this invaluable nt of manure in its most serviceable con- , his actual profit by the transaction has been greatly reduced, if not in some cases ilated by the immense profits which parties have realized at his expense. in terms, he has often—too often it is feared—been robbed. But, as he saw lvantage, evident and palpable, in his ig turnips, and did not see the robbery, he was quite content. He submitted to be fleeced—for his good—with as much meekness and resignation as his own sheep submit to the same process on a midsummer day, and with, perhaps, about as much care or consciousness as to the profit that others were realizing at his expense. We ventured a considerable number of years ago, to indicate, in terms as plain as we deemed it advisable to employ, that such was the case. The warning passed at that time in a great measure unheeded. Nevertheless, it was more needed at that time than it is now. Stuff was palmed off upon unsuspecting farmers under the name of manure ("superphosphate," dissolved bones," &c.), which, from the quantities of lime, sand, and other worthless matter which had manifestly been added to it, was often not worth half the money charged for it. The profits realized must have been enormous. Of late years, this wholesale system of adulteration has not been ventured upon; or at least, it certainly has not been carried to the same extent. We say adulteration; but it may be that the parties by whom the practice of adding these useless materials was pursued, regarded it as a necessary —as it certainly was a most profitable— part of their business. In preparing "superphosphate" from coprolites, &c., by the action of sulphuric acid and water, it is necessary, after the materials have been for a time subjected to the action of the acid, to add some substance to the mass for the purpose of drying up the excess of moisture. Parties equally ignorant and unscrupulous did not hesitate to add, for this purpose, lime, well sifted sand, &c.; and how much of these "dryers" was to be added was not, perhaps, always a matter of principle, but of expediency. When it was found that farmers could be so easily persuaded to buy almost anything under the name of manure, compounds were forthwith manufactured, under such names as "corn manure," "pota-

to manure," "grass manure," and so forth, sold at such prices as the seller thought fit to put upon them. As the compounder of such "manures" gave them forth for nothing definite (excepting so far as such names as the above might be held to indicate any definite composition), he probably deemed that he had a perfect right to make up his mixture of such ingredients, and in such relative proportions as, in the exercise of his generally profound chemical and agricultural knowledge, he reckoned best for his own interest or that of his customers; and with this "flattering unction" laid to his conscience, he would, doubtless, feel at full liberty to exercise a sound discretion as to which of these should be first or mainly considered. The all-confiding farmer bought—and paid — under the assurance given him, and perhaps confirmed by numberless testimonials, that he was obtaining the most potent manure in the market It is true these compounds generally contained a certain amount of really valuable elements of manure, viz., phosphoric and nitrogen—that latter commonly in the form of a little sulphate of ammonia or nitrate of soda—with, sometimes, a little potash; but the price charged for the compound was generally very much beyond the aggregate value of the amount of really useful matter which it contained: that is, the manufacturer took care that he should be well paid for his trouble in compounding his specific. We are not aware that any of these manure merchants took out a patent for his recondite process. Some of them, regretting no doubt that the word "patent" could scarcely be made available for their purpose, had recourse to what is called a "trade-mark." Sharp men of business from all parts of the island, and even from the adjacent shores of the Green Isle, speedily found out that profit was to be made out of the Scottish farmer; and wherever the most tempting and the most easily-secured prey was found, thither the eagles were gathered together, discerning, apparently, from afar, that the spoil was too rich and too abundant to be divided among such birds of prey as the locality might afford. It seems, indeed, that it is the number of manure dealers, or their "agents," and their anxiety to do business, that (more than anything else) has at last roused the suspicion of farmers, and led some of the more intelligent of them to adopt measures for their own protection. Deeming that they have suffered and been victimized long enough, they vow, like the "Knight of Industry"—not by the "Powers Divine," as he did, but—by the powers of pestle and mortar, furnace and crucible, that

It shall no more be so.

Our friends of the Buchan district have set the example in this matter, by instituting what they have called an "Analytical Association." The title may be somewhat ambitious, or, in the absence of any qualifying epithet as to what is to be analyzed, rather indefinite; but we presume the word "protection" is deemed to be in such bad odour that its use, in any sense, or for any purpose, however legitimate, had to be eschewed. Be that as it may, we congratulate the members of the Association on their very proper resolution to protect their own interests, and cordially wish them success. We have before now had evidence of the well-directed skill and intelligence with which the farmers of Buchan conduct their business, in the interesting and instructive reports on the cultivation of turnips which have appeared under the auspices of the Buchan Agricultural Society.

There are various ways in which farmers might combine, or rather, to speak more precisely, in which such combination might be rendered efficient for the purpose of practically carrying out the object which the Association has in view. We presume that the Association, in this case, is in no degree partaker of the nature of a trading company. Its proceedings, however, will require to be managed with some prudence and discretion. They should not, on the one hand, be brought before the general public in such a way as unnecessarily to injure the business or character of individuals or trading companies; and, on the other hand, they should not be allowed to become the means of advertising the business of any private indi-

vidual or trading firm. The Association may rest assured that any opportunity for effecting this latter object will be eagerly seized upon. There are already symptoms that such will be the case.

We have, on former occasions, entered more or less into the subject of the valuation of manures from analysis. We cannot recur to it at present. But that the value of a manure may be ascertained (with sufficient accuracy for the purposes of the agriculturist) from the *data* furnished by a properly executed chemical analysis, there can be no doubt. The Highland and Agricultural Society's chemist, as well as some others, seemed inclined a few years ago to depreciate this method of valuation. The writer of this endeavoured to shew that the objections raised against it were not necessarily valid; and the practice has maintained its ground, and continues to be used by all (including some of those who had objected to its use, except by what they called a qualified chemist) who have such a very moderate knowledge of the subject as to enable them to apply it with judgment.—*Aberdeen Journal.*

BREEDING AND FEEDING OF STOCK.

By Mr W. SANDAY.*

THE breeding and feeding of first-class stock having of late years attracted much attention, and being a pursuit on which I have been myself engaged for the greater part of my life, I felt that the result of my experience might be of use to others, and therefore I acceded to your request to read a paper on the subject. I have endeavoured to make my remarks as practical as possible, as I have not come across any article on the subject which can be said to be of any practical use. Breeding, as the more important of the two subjects under consideration, should first claim our attention. Shorthorns, on account of their early maturity, having become more popular in this country than any other breed of cattle, I shall confine my remarks to them; the same observations will, of course, apply with equal force to any other variety. To give some idea of the increase in the number of shorthorn breeders within the last twenty years, I may mention that in the year 1850 there were 316 subscribers to Coates's Herd Book, and the pedigrees of 1127 bulls entered; to the last volume we find 655 subscribers, with the pedigrees of 2366 bulls. I would ask, whether, in the opinion of this meeting, the number of really first-class animals has increased in proportion?

BREEDING FROM FASHIONABLE STOCK.

My own opinion is that the animals bred at the present day are inferior in size and quality to those bred twenty or thirty years ago. Now, if this be the case, surely there must be something wrong in the present system of breeding. It is evident that but little common sense can have been brought to bear on the subject. I am convinced that the cause of this deterioration is the principle on which most herds are raised—viz., the fashion—or rather infatuation—of collecting from certain families without any regard to the qualifications necessary for producing and perpetuating good animals. To follow out this plan, in-breeding must, to a very great extent, be resorted to, and the number of families on which such an experiment can be tried with the smallest chance of success is so limited, that in the majority of cases the consequences cannot fail to be ruinous. We

* Paper read before the Nottingham Chamber of Agriculture.

all know the difficulty of raising and keeping up a good herd or flock; this can only be done by breeding from the very best males and females, but the present system seems to set this rule completely at defiance; if an animal be only of the fashionable strain, it is sure to make a fabulous price, whatever its quality. Only last year two heifers were sold by Captain Gunter to a Canadian gentleman for £2500, and their produce, two heifer calves, has since been purchased by Lord Dunmore for the same sum (£2500). Should these calves breed, what price do you think Lord Dunmore will set upon their progeny? Of course it will be a high one, totally irrespective of their quality; should a bull be reared, doubtless he will be used, no matter what he may turn out. I have, of course, put this as an extreme case; but similar ones are constantly occurring, and this servile adoration of pedigree cannot fail to end in a disappointment, and ultimately in the deterioration of shorthorns. We may have some idea of the extent of the evil if we take the number of bulls annually exhibited at our various shows, and consider how few of them are really fit to perpetuate their species, and yet the majority of them are so used, which would in some measure account for the great scarcity of good animals. With many, a *long* pedigree is all that is considered necessary; but unless this pedigree be composed of really good animals the produce will probably be unsatisfactory. A well-descended bull or ram may, although not itself first-rate, produce first-rate stock; numbers of such instances have come within my own knowledge. The case is far different when the sire comes of a line of light-fleshed, delicate animals (and these, I am sorry to say, are in the present day only too numerous). Surely any of us may foresee the end of such an irrational plan, and yet it is pursued, as I have already stated, by numbers of breeders.

THE MANNER OF REARING CALVES—SELECTING SIRES.

There are two other causes which, in my opinion, must hasten the deterioration of many of our best herds, viz., 1, the artificial manner of rearing calves; and 2, the practice of using bulls before they arrive at maturity. 1. The artificial manner of rearing calves, especially bull calves. They are confined in small stalls or loose boxes, instead of being allowed to suck upon their mothers in the open pastures, where they could take any amount of the exercise so necessary to their muscular development. I am well aware of the difficulty of carrying out this plan to any great extent, but whenever practicable it should be adopted, if really first-class animals are to be produced. 2. The practice of using bulls long before they come to maturity. It will be sufficiently evident to every one that such a practice cannot fail to be injurious, and, though instances to the contrary may be adduced, they are only the exceptions which prove the rule. I am also quite of opinion that overfeeding is another cause of deterioration; but it is not likely to be discontinued at present, as, owing to the extreme difficulty of judging animals when out of condition, there are but few who will purchase them. I am well aware of the scarcity of first-rate sires, and never in the history of shorthorns have they realized such enormous prices; but had the supply increased in proportion with the number of breeders, no such difficulty would have arisen. One advantage, however, has been gained. There is no lack of useful bulls, which may be purchased at moderate prices, and these, I think, we may fairly congratulate ourselves, have much improved the ordinary stock of the country, more especially in Ireland, as may be seen by the superior quality of the cattle brought to our fairs and markets. Here I may perhaps be allowed to make a few remarks on the selection of this description of stock. In the first place, it should always be remembered that the male has a greater influence on the quality of the stock than the female; consequently, every female put to a good male will probably produce a better animal than herself; this rule applies to all ordinary stock put to a well-bred sire. Therefore, never spare a few pounds in the purchase of a good animal, for you may reasonably expect a handsome return for the

ıt expended in the improved quality stock. Secondly, with regard to the on, the importance of which I think ill admit, I would most strongly recom- you to fix upon a flock or herd known descended from a long line of heavy- d and robust animals, and one whose has a character for careful selection of eeding stock. Carefully avoid, however, bred from the light-fleshed, narrow, delicate animals so common at the ıt day. In purchasing a bull for ordinary above all things choose a fair-sized ıl, with good quality of flesh; if well nded, do not be too particular about ›rm. The shoulders are better well at the top, not narrow like the withers ıorse, no matter if a little coarse, if it is ı of constitution; the ribs should be ›prung, a most important point, but ılt to get; the hips large, even though ›hould be coarse; the head and neck ıline, and the horns rather thick than ›ise—a thick horn is a sign of robust- and vigour. I do not like the thin, y hide which so many admire; you ›e sure there is not much flesh under it.

DVICE TO BREEDERS—IN-BREEDING.

there may be some amongst my hear- ıo are breeders of first-class shorthorns, words of advice to them may not be place, though it must be understood hey do not in any way extend to those we may term "pedigree breeders." them I have no sympathy; and though bound to admit that large sums of y may be and are realized by this mode eeding, that its effects are injurious must ›parent to every unprejudiced person. I have said in my advice to farmers, pply here, only, if possible, with tenfold —viz., avoid any tendency to light flesh licacy of constitution. A cross of this is often attended with most disastrous s; a case in point occurred some years n the herd of the late Mr Richard ı, whose name is doubtless well known ›st of you. He had for many years been ing entirely from his own stocks, and thinking that a cross was beneficial, he was induced to purchase at one of the sales of the late Earl Spencer, a bull called "Exquisite." Earl Spencer's herd, though neat in form, was wanting in flesh and robustness, the very characteristics possessed in such an eminent degree by Mr Booth's, but the cross, contrary to Mr Booth's expectation, proved a most unfortunate one, the stock from Lord Spencer's bull being decidedly inferior. Similar cases have more than once occurred in my own flock of Leicesters, and this has strengthened my conviction that unless the male be superior, or at least equal to the female, in all essential points, deterioration must take place. Let me here, again, impress upon you the importance of selecting a bull from a herd superior to your own; he should, of course, be as perfect in form as possible, but the following points should be made a *sine qua non*—viz., good and heavy flesh, good looks, well sprung ribs, and, above all, a pedigree without blot. Bear in mind, however, that a long pedigree is not necessarily a good one. Success in breeding, I am quite convinced, requires a certain amount of intuitive knowledge; it is this which enables one to see at a glance when an animal is likely to be a good stock getter, or whether a young animal is likely to improve or deteriorate. I cannot believe that this faculty is possessed by many of the breeders of the present day; if it were, the quality of the cattle brought under our notice at sales and shows would be very different. To quote an eminent authority (Mr Darwin):—"Not one man in a thousand has accuracy of eye and judgment sufficient to become an eminent breeder. If gifted with these qualities, and he studies his subject for years, and devotes his life-time to it with indomitable perseverance, he will succeed, and may make great improvements; but if he wants any of these qualities, he will assuredly fail." Before concluding this part of my paper, I must say a few words on the subject of in-breeding, a subject to me most interesting, but at the same time m complicated. I feel certain that, under conditions, the experiment might be tried wi

every chance of success, but these conditions so seldom occur that it can be attempted in but few cases. The conditions to which I refer are these:—If two animals be first-rate in form and quality, without the slightest appearance of delicacy, or if the male be very good in points where the female is deficient, or if it be desirable to perpetuate any particular strain, then I think you might put father and daughter, mother and son, or indeed, any relations together, with the exception of brother and sister. Bear in mind, however, that any defects in the parents would be exaggerated, and each generation would decrease in stamina. From personal experience, I cannot speak with any authority, having only tried the experiment once, and then upon sheep—the result was not satisfactory.

EARLY TREATMENT OF STOCK.

I feel some diffidence in addressing you on the subject of feeding, being well aware that there are many present who are better qualified to do so than myself. I must, therefore, be excused making any lengthened remarks, hoping that some one may be induced to offer a few suggestions before the close of the meeting. I shall begin by saying a few words on the rearing of calves, and their after treatment until fit for the butcher. I have always considered September, October, and November the three best months to begin rearing, that the calf may be strong enough to withstand the second winter, which is always the most trying time. Each calf should have, if possible, a loose box not less than 9 feet by 5 feet 6 inches, especial care being taken that it be well drained, any accumulation of moisture being most injurious. Each box should be provided with water-trough, manger, and small rack for hay. New milk should be given for a fortnight at least; this should be gradually supplemented by skimmed milk, and mixed with linseed or oil cake porridge, that as many as possible may be reared. A little good hay should be given as soon as the calf will eat it, and I believe that no better food can be substituted. A small quantity of linseed cake may also be given, with pulped roots and cut hay; if hay be scarce, a very little straw may be added. At the age of fourteen or sixteen weeks, the milk may be gradually discontinued, and a little flour substituted, which may be mixed with the pulp and chop. This treatment should be continued throughout the winter and up to the first week in May, when the calf may be turned out to grass, fetching it up at night for the first fortnight at least. One lb. of cake per day should be given during the summer, and by the autumn this treatment should have produced an animal in good condition, and well able to get through the ensuing winter. The cake should now be increased to 1½ or 2 lb. per day, and equal portions of hay and straw may be given chopped and mixed with pulped roots. If the stock are to be sold at an early age, which I strongly advise, a small quantity of flour should be given with the chop. I would here impress upon you the importance of keeping every young animal in a thriving state; should it once lose its calf's flesh, it will take some time to restore it, and it should be remembered that time is money. At the end of the second winter, the yearling ought to be in good condition, and during the next summer he may be grazed in the store pastures with ewes and lambs. At two years old, those not sufficiently forward to be fed may be put into the straw folds; they should have an unlimited supply of cut straw mixed with pulped roots. If a sufficient quantity of roots can be allowed, they are, in my opinion, preferable for store cattle to any kind of cake. The heifers intended for stock may be put to the bull; a few of the rest, with some of the steers, may possibly be sufficiently forward to be fed in the winter. Feeding may commence with from 4 lb. to 5 lb. of cake per day with as many roots as can be spared, and if possible a little hay; the quantity of cake may be regulated to suit the time when the animals are to be disposed of.

FEEDING OF EXHIBITION ANIMALS.

It is a much debated question with feeders whether the preference should be given to boxes, stalls, or yards. I should place them

following order:—1. yards; 2. boxes; lls. It depends, however, in some re on the kind of cattle to be fed. will improve faster in yards or boxes, ows, from their quarrelsome disposition, tter in stalls. Farmers, however, have ften sufficient accommodation to admit oice in the matter. In the foregoing re- s I have pre-supposed that the stock been fairly bred, for it is only by this s that early maturity can be secured; same time I would have it understood I am speaking of ordinary stock, and f animals intended for exhibition. Not g any definite knowledge of the system ted by the large dairy farmers in rearing, not give any information on the subject, eg to refer you to the forthcoming ne of the Royal Agricultural Society's *al*, where you will find some valuable in the account of the first prize dairy

I may remark that the calves on this were economically fed, and in very good tion. With regard to the rearing and gement of first-class breeding stock, I strongly recommend that all the bull s should, whenever practicable, be reared cows in the open pastures; they should from six to eight months, and a few s before weaning should become accus- d to artificial food, as a calf so soon condition after leaving the dam. ise should be given regularly, this such an essential point. The bull s will, of course, receive the most l treatment possible until sold; the heifers only require to be kept in good growing condition, which can be done by giving a very small quantity of artificial food and good hay. They should be put to the bull at one and three-quarters or two years old, as, if this be longer deferred, they are likely to prove non-breeders. Stock for exhibition require the most liberal and careful feeding. Only so much should be given as can be consumed at once; if any be left it should be removed. This I believe to be the most important point in feeding. Change of food is also very essential. Linseed cake should be given with judgment: if too much be given, the animal is soon cloyed. But all these directions will be useless unless the intending exhibitor have an intelligent, persevering, and trustworthy servant, as it must depend upon his exertions to bring out the animal in show condition at the right time, which is no easy matter. Economical feeding, *i. e.*, obtaining the best results from the smallest amount of food, is of the greatest importance; but it is difficult to lay down any special rule on the subject. I shall not attempt to give any opinion on the different feeding-stuffs and condiments now before the public, my experience of them being very limited, malt, however, excepted. I am convinced that it is one of the most valuable foods known, not only as a condiment, but as a fat producer. Animals for exhibition are kept in better health on malt than upon any other food, milk excepted. I only hope I may live to see the day when it will be within the reach of every farmer.

LARGE AND SMALL FARMS AND STOCK BREEDING.

F late years there has been a great amount of discussion as to whether or small sized farms were the best for country. Many, indeed most of the rs, contended that the division of land d to the employment of more labour; ie, so far as we are aware, ventured to declare that small plots of ground in this country can be cultivated with the same economy and success that large farms can be. Let us cut down the fields into small parcels, and give each man a spade in his hand, is the argument of a few, who regard popularity more than the progress and prolific-

ness of this country. Over and over again we have satisfactorily shewn, from official facts and figures, that the large farms, when their owners possessed education and skill, yielded much more in proportion to the expense of the working, than the little crofter's places in the north.

Belgium has often been quoted in favour of spade-husbandry; but Belgium has a soil different from ours, and a population that lives on less money than British agriculturists, as a rule, would like to take. But farming, like all other professions, requires money to carry it out to the best advantage. Capital and skill alone can secure the utmost yield from the earth. Such has been always our opinion, and we are glad to see it confirmed, so long ago as 1811, by Mr J. Bailey, who was intimate with Mr G. Culley. In his survey of Durham, so early as fourteen years before the date we have named, Mr Bailey, who belonged to the shorthorn district which Culley, Collings, and Bates made famous, makes mention of the advantages which large farms possessed over small. He says, according to Mr Bell's "History of Shorthorns," which has just come out, that "In this" (speaking specially with reference to the breeding of cattle), "as well as in every other district I am acquainted with, the occupiers of large farms have been the first to make improvements, to introduce new implements, new modes of culture, and improved breeds of live stock. It is men of education and superior intelligence who travel to examine the cultivation of distant counties, and improved breeds of cattle, sheep, and other animals, and who have capital to carry into effect whatever they may think will improve their own districts. Messrs Culley and Charge were the first that led the way, and they have been followed by Messrs Collings, Mason, Taylor, Nesham, Seymour, and many others, by whose exertions and judicious selection, this district will be lastingly benefited."

Mr Bailey, besides being sound on the advantage of large farms over small ones, is equally prophetic and thorough about the advantages that would flow from the judicious selection of sire and matron in the case of cattle.

The results of this skill and care were seen even before he wrote. Mr Fowler's bull, at Mr Paget's sale, brought 400 guineas in 1793; now we can manage—entirely through the enterprise of large farmers—to bring for shorthorns treble the amount. For two animals, 2500 guineas have recently been paid, and their progeny have already about recouped the owner. Only by careful selection and strict attention to the peculiarities of each animal, could such grand results be achieved.

THE POTATO DISEASE.

THE potato disease has re-appeared with a virulence unequalled since 1846—the year after its first appearance in Great Britain. It is a melancholy fact that one of the chief articles of diet of the poorer classes should fall a prey to a disease so subtle in its character, that, despite the investigations of science, and the specifics which its devotees prescribe, its progress cannot be stayed. Authorities in this, as well as in all difficult questions, are at issue, and the more they publish their views—all plausible enough to the superficial observer—the more perplexing and unsatisfactory their findings do become. We want a specific, or a plan of working, to bar the evil day, if we cannot get a remedy. Some say, plant in a high and dry position, where the winds of heaven blow without being in any way intercepted. We have done that, and still the disease was there. It may not have been so virulent, so devastating in its action; but there it is. Like infec-

tious troubles common to mankind, it is partial in its ravages. Some portions of a field may escape in a manner unscathed, while others are all but a total loss. Moreover, it comes upon us with the suddenness of a cyclone, and fields once contaminated, cannot by any alleged specific, or by any system of management, be arrested. The stealthy enemy is charged with poison, that makes insidious raids upon vitality; and first, leaves, then haulm, then tubers, are affected, and the affection is often strong and swift in its progress. In the course of twenty-four hours the enemy has done its work. It may have been acting for weeks previously; but on examination we find slight symptoms of disease during August, but on the day of the 1st September, in the field where our observations were taken from, it seemed from the number affected that the disease had spread with almost plague-like virulence, and the half of the crop was touched, and consequently is so much destroyed as an article of diet for the people.

The haulms were undoubtedly first affected. The leaves seemed as if touched indiscriminately over the plant, some not affected at all, and others so much so as to have ceased to discharge their functions. So sudden does the virus extend, that it is a work of difficulty to tell whether the tissue and cellular matter ever assumes a putridinous character. There can scarcely be a doubt, we presume, of its being the work of parasitic fungi, and if it be so, the fungal cysts in extending their area lick up the vital juices as if by magic, and rapidly arrest the circulation going on in a healthy state. Of course, the leaves are not at all of a succulent character, but in other plants, with leaves equally thin and membraneous, the same dessicating process does not go on in common with the first stages of putrefaction. It is not, however, in the leaves only where this is observable, but in the haulms. The stems get discoloured at intervals, then dry up with great rapidity, assuming the discoloured form of the affected tubers, and running in to pitted cavities, eventually to the entire destruction of that part of the haulm immediately above where the virus has begun. What, however, must strike every observer, is the sympathy that exists between the ripening tuber and the tops, which grow in so rapid a state during the three months of June, July, and August. The affection is conveyed through the ordinary channels of vitality, and very partially too, else we would have tubers affected in common. We never observed the contagious process in so manifest a degree as during this season, although its partial distribution has always been a theme of comment, and has been a means of unsettling the minds of our authorities in the investigation of the disease. Potatoes that were partially affected to-day, were victims of almost complete putrefaction to-morrow. And the putrefaction was of the worst kind. The dessicating process going on was powerful enough to pump out the vital fluid of the leaves, but its agency, combined with the swift decomposing nature of the disease in the matter of the tubers, brought about such a state of putrefaction as was felt without being seen. The stench from the contaminated fields was oppressive, increasing, of course, with the bright sunny weather that prevailed; and when the diggers went to work there was proof positive that a terrible state of disease was afloat, and that the potato crop of 1871 was to the extent of at least one-half affected by disease.

The lessons we learn from all this, and from the observations that have from time to time been addressed to the political and to the scientific press, go to shew that we are all but powerless in the matter. We may have agreed that the disease is due to fungi, as was promulgated by the late Dr Lindley, and by the Rev. Mr Berkeley, one of the most distinguished mycologists of the present time, and has since been authenticated by Dr Julius Kühn, and by many others; but how about putting into the hands of the producer a prescription to act upon so as he may be able to draw a cordon for protection around him? That is the great question to solve, and, moreover, seems not only difficult to solve, but incapable of solution. And there need be little wonder when we consider that

these parasitical organisms descend from above, and cannot be intercepted. There is such a thing as what one might call farming fever in inhospitable localities where air is confined, and where its circulation is impeded by surrounding objects, where stench, and filth, and pollutions of many kinds prevail, and there is such a thing, too, as encouraging potato blight in low ill-drained, ill-ventilated (if we may use an expression to confined areas) fields. It may also be encouraged in tenacious soils, in soils too rich in humus, which only aggravates the putrefaction once it has begun. The best antidote against these parasitic germs, the best means of averting the introduction and spread of the mycelium, is light sandy land, with a gravelly bottom, where moisture in excess runs away and is not husbanded. Light lands, as a rule, give the best quality, if not the best crops of potatoes, and both farmers and gardeners stand very much in their own light by overfeeding ground, to have certain light crops. A medium crop of good quality should always be aimed at. There is no better example or proof of the disease being favourable in its extensions than the case of garden ground. Many fields may have only one-third less, while gardens in the same locality may have two-thirds unfit for the market. Many ascribe certain good results to cutting the haulms down whenever the black blotches appear on the leaves, but it is a mistake. The arresting of growth is of itself sufficient to present the tubers in a good state for infection, and it is always before the growth is completed that disease or blight sets in. It cannot be good, therefore, to shear their haulms before they have completed their office of cultivation to a mature state. The tubers, to keep well and healthy, must be ripe to keep them as free from the spread of myceliums as possible, they must be kept on the dry order.

PRIZE FARMS AND FARM HOUSES IN CHESHIRE.

THE following Report of the Inspectors appointed by the Cheshire Agricultural Society for the purpose of fixing the awards of the farm and cottage competition, will be read with interest:—

FARMS.

Premium 1, to Mr Joseph Robinson, Lee Green Hall, Middlewich. Claimant's certificate. Farm contains 275 acres, cropped this year as follows:—pasture, 117 acres; meadow, 41 acres; wheat, 22 acres; oats, 26 acres; barley, 4 acres 2 roods; clover, 24 acres; potatoes, 10 acres; turnips, 5½ acres; plantations, occupation roads, and waste, 7 acres. Course of cropping:—first year, oats; second, green crop; third, wheat; fourth, oats or barley, with seeds. Stock consists of 71 dairy cows, 2 bulls, 12 heifers, 18 rearing calves, 30 sheep and lambs, 65 pigs, 5 team horses, 1 hack, 2 colts—total, 206. This farm was, until very recently, held under lease, but is now a yearly tenancy, and judging from the amount expended by landlord and tenant, there is a feeling of confidence existing in both, and not mis-placed by either; but as our instructions are "not to take into consideration the amount expended on the farm," we shall "notice its management with a view to the amount of profit realized upon it." The homestead is well situated, commanding a beautiful view of the greater portion of the farm, the other is more undulated and bounded by the river Weaver. The house and buildings are commodious, and well arranged, with the exception of the dairy accommodation, both are in excellent repair, and well painted, the shippon annually whitewashed, and kept remarkably clean; the same remark applies to the whole of the premises, neatness prevailing throughout. The approach to the farm from the road has been much improved by the tenants, protected with a light galvanised

encing, costing altogether about £40. tackyard, which is often the most unart of a farmery, is kept very straight rderly, and in addition to shewing signs abundant hay harvest, contains three s of last year's growth. The kitchen n of ¼ an acre is well stocked with trees, and useful vegetables, and is superior management. Both the soil ubsoil of this farm is various, making it y desirable one for mixed farming in days of change and risk; the clayey eing very suitable for dairy pasturing, amy and light soils for tillage, and the ying meadows for mowing. It is cul-dasa dairy farm, one-fourth only being in . Keeping this in view, the claimant aid great attention to his grass land, his res having repeated dressings of bone res, consequently shewing a rich and ful herbage. Two fields, of 20 acres were the best we have seen this season, ave been boned twice these last three , and bear good evidence of it. The land is well worked, and kept very of weeds, an important fact to be noted se who are too fond of a large tillage. neadow land receives its share of at-n, and that portion of it not watered the river has repeated dressings of farm-manure. All the crops were heavy the exception of 8 acres of potatoes, were clean, well drilled, and regular in but the haulms were not vigorous, and d signs of disease, the bulbs not over 1¼ acres of early ones were marketed he land sewn with turnips, and 1 acre d with new seed looked extremely 5⅗ acres turnips, manured with or & Ryland's manure, promise to be a eavy crop, very clean and are already in the bulb, a few, very few, blank s might perhaps with advantage have filled up. 11 acres of the same field is nd crop of clover, looking well, and 12 of another field of second crop of Ita-yegrass and clover want cutting, and eavy crop. 17½ acres of wheat is a full crop, 4½ ditto extraordinary strong, laid, no machine will be able to cut it. 20 acres oats, equally good, with clean stubbles. 6 acres mixed crop of wheat and oats, the former injured with wireworm, the latter sown to fill up, which is now a thick crop. The land newly seeded down shewed a judicious assortment of all the best grasses and clovers, the alsyke predominating. The gates are in good order, and painted. Fences, mostly new, straight, and neatly trimmed. There is some useless hedgerow timber, which is injurious to the tenant and not profitable to the landlord. A first-class dairy of cheese is made by Mr Robinson from 71 well-bred dairy cows, over 3 tons being sent to market, the remainder looking well and forward. The general improvements are the filling up of useless pits, eradicating old and crooked fences, replacing them with new where requisite, filling up and draining ditches, &c.; in fact, nothing is left undone that would add to the appearance of profit of the farm. Mr Robinson has this year done what it would be well for all claimants to imitate—viz., compete with a determination to win if possible. A visit to Lee Green Hall will well repay any one who can admire practical farming combined with good management and selection of stock. It answers well the description of a model farm. Mr Robinson had a very formidable opponent, who shewed some excellent pastures, good wheat, and first-class second crops. Inspected August 19, 1871.

THE SECOND PRIZE FARM.

Premium 2, to the resident tenant, principally dependent upon farming, of any farm, not being less than 100 acres and not exceeding 150 acres, who shall have the same in the best and most complete state of management, Mr Henry Sanderson, Wallerscote, Northwich. The extent of this farm is 120 acres of deep-soiled level land, with varied subsoil, close to a good road, with railway station within easy distance, and bounded on the north by the river Weaver. It is occupied mostly as a dairy farm, the milk being sent to Manchester twice each day. Mr Sanderson's manner of cropping is—1. oats; 2. potatoes and other green crops; 3. wheat;

4. oats with seeds. The crops this year are —44 acres pasture, 21½ acres in mowing, 6 acres wheat, 16½ acres potatoes, 2 acres turnips, 2 acres mangolds, 3 acres vetches for stall feeding, and 2 acres of beans. Part of the grass land is newly laid down, boned, and a good rich herbage, both new and old being free from weeds. Of the wheat, 10 acres is a very strong crop, almost as strong as can be grown, and the remainder a fair crop. The potatoes, planted on old turf, 8 acres of early ones being got up, and the land planted with turnips and mangolds, which are healthy and covering the land; the remainder, of various kinds, a full crop; the headlands clean and sown with turnips. The beans sown upon leys broadcast, well podded and a good crop. Oats cut and mostly carried, a clean stubble, and a good root of clover amongst it. The fences irregular and old, not clipped with some annual weeds; the water-courses well attended to, and roads and gates in tolerable repair. The live stock consists of 35 cows, 12 stirks, 7 calves, 4 horses, and 20 pigs; are useful, and well suited to the neighbourhood. Ten tons of bones, and 100 tons of horse manure are purchased annually, and applied to clover, pasture, and green crops. 120 roods of old fences eradicated, and 70 roods of new planted, and a considerable quantity of draining, both done at tenant's expense. The out-buildings mostly new and well arranged; the house old, but in good order; garden well cropped, and many young fruit trees planted in it by tenant. The farm is in a progressive state of improvement. Inspected August 17, 1871.

COTTAGES AND GARDENS.

Premium 1, to Robert Symn, Riddal Heath, Tarporley, being an agricultural labourer, for having his cottage and garden in the neatest and best order. The cottage is good and roomy downstairs, but has only two sleeping rooms; it is kept very clean and orderly, is tolerably well furnished, and contains some very choice window plants. The garden, of about 15 roods, is in a good state of cultivation, and very free from weeds; the greater portion has been first cropped with potatoes, and is now planted with cabbage, greens, autumn onions, &c. Peas—a splendid crop. A large plot is devoted to the growth of strawberries, a very profitable kind, over 200 quarts being sold off; half of these roots are renewed every other year. A good bed of useful herbs is grown. This claimant has a great variety of flowers, over forty different varieties occupy a small space. In a small tool-house, all his seeds are carefully boxed for another year.

To Charles Leicester, Plumbley, Northwich, being an agricultural labourer, for having his cottage and garden in the second neatest and best order. This is a good new cottage, the property of Lord de Tabley; has three good sleeping rooms, with every other convenience requisite; is kept in beautiful order, and is very well furnished. The garden, of 8 roods, is very clean and straight; two-thirds only are a second crop, and not very full; the greens not a good sort. The cabbages, scarlet runners, carrots, and vegetable marrow looking well; a quantity of cabbage sown for sale in the spring; a nice assortment of fruit trees, with a few flowers of medium quality; a useful bed of herbs. Keeps two pigs.

PREMIUM NO. 2.

First prize awarded to Joseph Warburton, of Over.—Joseph Warburton is a salt boiler, and occupies a new cottage consisting of two lower rooms and a small scullery, and three sleeping rooms; all the rooms whitewashed, neat, and clean. The garden contains about 8 square rods of land, with a small portion devoted to flowers, which are tastefully arranged, the remainder having upon a large proportion some very good second crops of cabbages (red and white), celery, greens, cauliflowers, and turnips, with good crops of scarlet-runners, onions, beetroot, and a fair selection of sage and other herbs. There were but few fruit trees, the ground not having been long enclosed, and occupied by the present tenant only one year. There was a pig in the stye, and this garden, which was in a very productive state, was in

order throughout, being kept very neat idy.

cond prize awarded to James Smith, mere.—James Smith is carpenter to Mr ıer, and occupies a cottage with two s downstairs and three above, which is furnished and kept in good order. Of ;arden, which contains about 8 rods, a portion is devoted to flowers, of which ı appears to be very fond; and he has both a small greenhouse heated by a stove and also two good cucumber frames full of beautiful flowers. The portion devoted to vegetables contains carrots, rhubarb, dwarf and scarlet runners, peas, beans, strawberries, and some very good second crops, the whole looking vigorous and healthy; the garden being very well cropped, but not kept so neatly and in such good order as that which takes the first prize.

IRRIGATION AT STOKE PARK.

ENI, vidi, vici! is an exclamation quite allowable to Mr Isaac Brown, when ızes upon his irrigation work at Stoke

The 40-acre field which has been ıted upon by him, stands out from the unding land like an oasis in the desert. ıt, and green, and pleasant to the eye it , while all neighbouring enclosures are lly as "brown as a berry." It is a sight ı seeing and worth pondering over by oprietors where water is accessible. For by the application of pure water alone, ıuch grand results obtained.

t before noticing the growth, which the ːation of Mr Brown's System of Irriga- has secured upon a not extremely pro- g subject, we shall briefly describe the . Stoke Park, now owned by Mr Cole- lies about 2½ miles from Slough, on the : Western Railway. Its site is one of ıest in the kingdom—wood and water interspersed in a manner that even nost fastidious artist would not care to the arrangements. The old house and : have a curious and chequered history. lty, has slept beneath the roof of the :; Royalty has been confined in the apartments; Royalty has bequeathed state to a favourite; and by the com- of Royalty, that favourite's house, the owner was on his death-bed, was searched for seditious papers. The old house in which the Hastings and the Huntingdons, in turn, had resided, was rebuilt in the reign of Elizabeth, and in that mansion we are told that "good Queen Bess" of merry memory at times took up her abode. The present owner has here stowed up some valuable portraits of the illustrious Queen; or, at all events, of the Queen during whose reign England was the most illustrious of nations. Misfortune, as misfortune, like a nightmare, will come at times upon all, fell upon the house, and it was sold for debt. King James I., "ging- ling Geordie's" friend—who did much more for education than ever his royal pedantic majesty, presented it to Chief-Justice Coke, to whose memory a tall column with a sculptured likeness was erected, and still stands near the old house. The unhappy son of the sixth James of Scotland and first of England—Charles I.—who, thinking that Coke was too familiar with Hampden, had ordered the search of the dying old man's house, was himself confined as a prisoner in this very mansion, which, after several vicissitudes, became the property, by pur- chase, of the illustrious Penn. This noble and generous quaker erected a monument to the poet Gray, who wrote his "Elegy" within the shadow of the ivy-mantled church that stands within the grounds.

What a difference now from the time when Gray wrote—

"The curfew tolls the knell of parting day,
The lowing herd winds slowly o'er the lea;
The ploughman homeward plods his weary way,
And leaves the world to darkness and to me."

Here we must call a halt—a truce to old memories. We have no curfew tolling, no lowing herds of the placid character that Gray describes, no weary ploughmen; and there is no chance, for eight months of the year at least, of a poet being left to darkness and himself.

The present enterprising proprietor keeps none of these patient beasts on his estates. The dull, sluggish animals of the poet's lay have been supplanted by magnificent West Highlanders, and the old-fashioned "crummy" has been superseded by the finer and better milk-producing Alderneys. Many antlered deer roam beside them. The ploughman is not wearied now, does not need to drag his heavy hob-nailed boots sluggishly one after another, for he rides upon his plough, which is dragged by an engine on the Howard plan. The poet cannot be in darkness and alone, for all night long, from February until November, he may see the light of the fire of the engine which distributes the life-giving water over 40 acres of grass.

In our number for October, a report was given of the results of the application of Mr Brown's System upon the land, and after seeing it, we can unhesitatingly guarantee all the facts therein stated. We saw the hay referred to in the report, and can assure our readers that it is of excellent quality, such as cattle and horses would eat with avidity. We can supplement the facts in that report by others coming under our own observation.

The crop was taken off the land in the second week of August. On our visit on Tuesday, we found the grass in many places where it had been well-watered, and where manure had been applied, from 12 to 18 inches long—so long and rank, indeed, that in our own opinion it ought to have been cut some days before and fed to the bullocks in the park, upon which, notwithstanding the rain of the previous Friday night and Saturday morning, there was scarcely a blade of grass to be seen. All over the field there was a growth of from 7 to 9 inches. It has been said that cattle do not care for grass forced forward in such an artificial manner. People so reasoning speak altogether without book. An area of about 2 acres was hurdled off, and upon this twenty large Highland bullocks, worth, say, in round numbers, about £30, were placed a week before the date we visited the place. They had, we understand, been stall-fed previously, so that if any cattle were likely to "turn up their noses" at the fare which Brown's Irrigation System provided for them, these were surely the most entitled. But so far from doing this, they eagerly set to cropping it, and ate with evident enjoyment. In fact, to use the steward's expression "they took their fill." And yet after a week of glorious grazing, they had not succeeded in making the 2 acres quite bare. The grass was left, however, as even as if a reaping machine had gone over the surface, which shews that all the grass was alike palatable. Calculating the keep of each beast per week at 5s. per head, which is a very low estimate, this would give a value per acre per annum of £25; and at 7s., which is not an extravagant value to put upon the weekly keep of such bullocks, it would mount up to £35, and this upon land which, as we have said, is by no means first-class.

Wherever there is water on an estate, we should certainly recommend Brown's System as a most profitable one. The pipes distribute the water in the most gentle and genial rain-like manner. They are placed below the ground, in such a way that neither hoof of horse nor ox can injure them, and the outlay is not extravagant.

We may mention, as several persons who have gone down to see the process have been disappointed, that the work does not go on during the day; but any person interested, on application to Mr Coleman or Mr Brown, stating the grounds of their interest, will, if these are satisfactory, have an opportunity of seeing the pipes at full play during the day.

IMPORTS AND EXPORTS OF AGRICULTURAL COMMODITIES.

CREDIT is really due to the officials for the regularity with which the Trade and Navigation Accounts are now printed. They are to be always depended upon on the 7th of the month, bringing quantities and valuations up to date. The "Circumlocution Office" in this governmental department may be said to be abolished. We wish the same remark were applicable to every other section of State business.

For the three-quarters of the year that have passed, we have received a much larger supply of cattle than in the corresponding period of 1870—in round numbers 157,000, as against 125,000—figures which would seem to prove that the home-supply is very deficient; and they also lead to the understanding that, but for the receipts from abroad, the price of meat would be immensely higher than it is now, when it is exorbitant.

Sheep, during the month, we imported in very much larger numbers than in September of last year, in fact, the number landed was nearly doubled. The precise figures were:—September 1870, 53,721; September 1871, 104,264. On the nine months, also, the increase was remarkable, the number we imported to the end of last month reaching 700,131, as against 513,602 in the corresponding period of last year. Calves also came more liberally, both in the month and nine months; and the imports of swine, although these animals are rather scarce now in the Metropolitan market, have, in the month, declined from 12,031 to 9791. In the nine months there is little change in numbers, as, up to the period for which the Returns are made up, we have imported 71,381; in the same period of last year, 71,854. Bacon, which, as arranged in the Returns, comes under the same heading, or at all events in alphabetical order, bulks much more largely both during the month and nine months of this year, than it did in the like period of last. In the month we had more than three times the quantity that we had in September 1870, and in the three-quarters of the year more than 300,000 cwt., the exact quantities being, for this year, up to the end of September, 730,181 cwt., in the like period of last year only 428,674 cwt. The total amount of money that we disbursed for live animals and bacon, up to the end of last month, was £6,336,950, a portion of which we think, with carefulness in regard to infectious diseases, might have been retained in our own pockets.

But this is not all the money we paid for animal food. We gave £480,113 for salted, and fresh or slightly salted beef; £124,123 for hams; for preserved and other meat, not enumerated, £449,664 (and it may here be observed that no less than £415,330 of this was paid out for preserved meat alone, shewing how much this commodity is growing in public favour); for pork, £604,630, and for poultry, game, &c., £78,856. These items, combined, make, in all, £1,737,386, which, added to the amount previously mentioned, makes a total of £8,074,336.

Our imports of wheat during the month were considerably in excess of those received in September of 1870; and in the nine months we imported about 4,500,000 cwt. more, the totals being, for the first three quarters of 1870, 22,908,916; in the same period of this year we took 27,338,951 cwt., at a cost of £15,956,011; while last year, up to the same date, we only paid away £11,836,971—the difference in the value, per cwt., being about 1s. 8d.

During the month Russia and the United States were our principal contributors, as indeed they were the whole season through, as will be seen from the annexed table. With reference to other commodities coming under the general head of corn, we notice that we have a smaller supply of both oats

and barley, and also of peas, but a larger importation of beans.

QUANTITIES.

Wheat.	Nine Months ended Sept. 30, 1870. Cwt.	Nine Months ended Sept. 30, 1871. Cwt.
Russia	7,013,763	11,017,777
Denmark	271,993	63,208
Germany	3,022,275	2,154,962
France	80,840	109,819
Austrian Territories	45,272	229,147
Turkey, Wallachia, and Moldavia	353,709	1,318,139
Egypt	100,584	342,370
United States	9,475,497	9,330,065
Chili	461,312	291,361
British North America	1,930,243	1,976,645
Other Countries	153,428	505,458
Total	22,908,916	27,338,951

VALUE.

Russia	£3,335,464	£6,232,351
Denmark	133,872	39,223
Germany	1,744,315	1,412,386
France	43,527	57,745
Austrian Territories	20,749	146,475
Turkey, Wallachia, and Moldavia	155,938	686,838
Egypt	43,129	181,864
United States	4,963,520	5,564,761
Chili	275,900	186,110
British North America	1,038,090	1,138,258
Other Countries	82,476	310,000
Total	£11,836,971	£15,956,011

QUANTITIES.

	Nine Months ended Sept. 30, 1870. Cwt.	Nine Months ended Sept. 30, 1871. Cwt.
Barley	5,458,411	5,289,596
Oats	8,260,093	8,091,035
Peas	1,540,260	672,408
Beans	1,083,675	2,006,763
Indian corn	12,118,470	11,649,729

VALUE.

Barley	£2,129,217	£2,067,524
Oats	3,311,170	2,942,871
Peas	639,667	293,733
Beans	457,133	870,206
Indian corn	4,177,556	4,454,672

QUANTITIES.

Wheat Meal and Flour.	Nine Months ended Sept. 30, 1870. Cwt.	Nine Months ended Sept. 30, 1871. Cwt.
Germany	685,708	651,095
France	627,646	12,368
United States	1,577,717	1,492,405
British North America	273,283	247,348
Other Countries	406,435	595,187
Total	3,570,789	2,998,403

VALUE.

Germany	£472,320	£611,353
France	452,256	11,223
United States	1,040,966	1,140,076
British North America	195,407	186,970
Other Countries	293,343	576,954
Total	£2,454,292	£2,526,576

Turning next to other articles of provision, we notice that we have imported, in the month, nearly 8000 cwt. less of butter than in the corresponding month of last year, but in the nine months that have expired upwards of 160,000 cwt. more. The cost of butter, up to the end of September, was £4,985,623; last year, to the same date, £4,590,609, which shews that we were getting it, in round numbers, at about 1d. per lb. less this year. With cheese we were supplied more liberally in both periods, and the prices were not so extravagant as in the previous year. For 672,649 cwt. we paid, in the three-quarters of the year 1870, £2,000,766; in the same time of 1871, for 874,404 cwt., we were debited with only £2,413,372. But surely £7,500,000 of money is more than we ought to pay for dairy produce, our own country being so well adapted for the rearing of cattle.

With regard to manurial substances, we remark that bones have been in much the same demand during September this year as last, but in the longer period we note an increase of 9000 tons, but the prices this year about correspond. The total sum paid out up to the end of September for this commodity was £435,127, to compare with £371,274 in the corresponding term of last year. The receipts of guano, alike in

the month and nine months were very deficient—in the former period only 3623, as against 25,379; and in the latter 152,227, to compare with 203,052 tons. The respective costs up to the end of September were, this year, £1,736,843, last year to the same date, £2,518,696. Nitrate of soda, however, would appear from the imports to be gaining greatly in repute. On the month there was an increase of 12,000 cwt., and in the three-quarters of the year more than 252,000 cwt. The cost was—1870, £614,939; this year, £801,360.

The number of foreign eggs received was much smaller both on the month and nine months, than in the corresponding terms of last year, and we should like to see them falling off more, could we be assured that the decline indicated the increase of the home produce. The total quantity expressed in "great hundreds," was this year up to the time that the accounts were made up, 2,688,067; last year, up to the same date, they were 3,011,475. Notwithstanding the diminution in numbers, however, we paid nearly £130,000 more for them than we did in 1870, a fact which shews that there is a wide and profitable field for poultry cultivation. The respective sums were, last year £859,596, this year £988,482.

There was a large increase in the supply of potatoes during the month, indeed the quantity was almost doubled, but on the nine months there was a considerable diminution, and the sum we have paid up to the end of September is less by £100,000 than it was at the same date last autumn.

Cotton-seed for feeding purposes is growing in public favour. Month after month, and year after year, it is being more sought after. The amount paid for it during the nine months was £1,270,257; in the same time of last year, only £888,215. Rape was in slightly less demand during the month, but in the three-quarters of the year there was a large increase in the imports, the price paid for it up to the end of September being £1,321,372; last year at the same time, only £730,402. In the month, we only received about half the quantity of oil-seed cakes, but in the nine months, about 17,000 tons more, the cost being £1,104,635.

In hops there was again a tremendous increase, the short crop of this year and the high prices inducing foreigners to send largely. In the month, we got 9054 cwt., to compare with 1560 cwt. in the corresponding period of last year.

The quantity of wool received during the month was, 3,500,000 lb. more than in September 1870, and it is rather unusual to have to note that the increase is more than entirely due to the imports from European countries. The following table shews the imports and the values for the three-quarters of the year:—

QUANTITIES.

	Nine Months ended Sept. 30, 1870.	Nine Months ended Sept. 30, 1871.
Wool, Sheep, and Lambs.	lb.	lb.
From Countries in Europe	12,008,539	37,952,240
,, British Possessions in South Africa ...	21,196,437	24,375,725
,, British India	7,930,938	16,468,894
,, Australia	164,243,690	172,038,988
,, Other Countries.....	11,907,453	24,905,075
Total	217,287,057	275,740,922

VALUE.

From Countries in Europe	£637,655	£2,043,360
,, British Possessions in South Africa ...	1,367,842	1,272,547
,, British India	246,311	572,699
,, Australia	10,416,265	10,074,859
,, Other Countries.....	375,325	931,170
Total	£13,043,398	£14,894,635

On the credit side of our account, to set against all the items we have enumerated, we find in the way of payment for agricultural articles, £236,399 for butter, which is £25,000 more than we got in the first nine months of the year before, and £67,617 for cheese, which was £10,000 less. For horses we have received £238,031, or very nearly £90,000 more than in the first nine months of 1870.

Our Library Table.

The Gardener, Nos. I. to IX. for 1871 : Edited by DAVID THOMSON. London and Edinburgh: W. Blackwood & Sons.

THIS is a monthly serial devoted to practical gardening. It has been frequently placed from time to time under a variety of conductors or editors, and has had a somewhat chequered career. It has always been the popular organ of Scotch gardeners, and many excellent contributions have adorned its pages. Not the least prominent were the remarkable papers from the pen of the late Dr Smith, of Ecclesmachen, on the "Degeneration Theory," which confounded, in some degree, even the late Dr Lindley. It has aimed at all times to disseminate the most sound practical information, and has in recent times even taken a wider field. It is aiming to keep pace with the age, and place upon record the most advanced and most intelligent practice of the times. That it is succeeding, we are glad, in the interests of horticulture, to announce. The present volume, or that portion of it already published, stands in favourable comparison with any of its predecessors. Like all serial literature now-a-days, it is not without blemishes, but the matter is very sound and safe.

The article on Vines and Vine-borders by Mr Wm. Thomson, in the January number, is eminently practical and instructive, directing attention to the cause of shallow poor borders being more prolific of root than rich, properly-constructed ones, and pointing, with the finger of caution, against plethoric unripened Vine-canes. Mr Fraser, in his Notes on Rhododendrons, remarks that in crossing species, attention should always be directed to have the hardiest one as the seed-bearing parent, as the progeny in that respect takes more after the female than the male parents. There is also a good illustrated article on Pandanads. In February, we have a first-rate article on Succulents, by the Editor, where he points out how "the flaunting daub of colour" should be toned down to please the eye of taste. No better subjects have been selected in modern ornamentation than a variety of these succulents. There is a useful paper on bedding-plants, in which Pelargoniums, Vesuvius, Gloriosus, Grand Duke, Fire King, Lucius, Jean Lesley, &c., are considered great gains in that family. In March, we have a diagram of Picturesque Beds, and some remarks upon how they ought to be properly filled. To our thinking they are more gardenesque than picturesque, but independent of that they exhibit how planters should avoid the dumpy form or contour, blending it, or correcting it, rather, with Palms, Yuccas, &c. There is a good article on Strawberry Forcing by Mr Simpson; and a paper on Table Decorations. In April, there is an illustrated article on New Plants, a complete and useful list of Rhododendrons, and a seasonable paper on Hardy Primulas, and how to grow them for in-door decoration. In May, there is a good notice, with a couple of illustrations of Cypripediums, and a remark that they are well grown at Mayfield, Falkirk, N.B. There is also a series of articles entitled, "Hints to Amateurs," which are pointed, and must be instructive to those to whom they are principally directed.

The Sub-Tropical Garden; or Beauty of Form in the Flower Garden. By W. ROBINSON, F.L.S. London: John Murray, Albemarle Street.

MR ROBINSON has rendered good service to the old art by writing this book. It is admirably got up, and profusely illustrated. In its handsome pages, beauty of form in the flower garden can be studied with high satisfaction, as well as real profit. About sixty of the choicest subjects for this style of gardening are illustrated by the graceful and exact pencils of Dawson, Whymper, Hooper, Vilmorin, and Andrews. These constitute a choice gallery of fine foliage plant portraits. Ample descriptions of the least tender and hardy species are given, alphabetically arranged, with brief cultural notes, sufficient to produce the plants in the best condition for the purposes intended. This is followed with select lists for various purposes. Then we have sub-divisions, thus:—A selection of hardy perennials affording the finest effects in the sub-tropical garden;—a selection of the finest tender sub-tropical plants that will succeed in our climate in summer;—a selection of hardy plants suited for isolation on the turf of the flower garden and pleasure ground;—a selection of plants useful for the open air in summer, and for embellishing the conservatory in winter;—a selection of hardy plants of vigorous habit and distinct character, suited for planting in semi-wild places in pleasure grounds, or near wood walks;—a selection of kinds that will best withstand wind;—a list of sub-tropical plants to raise from seed;—a selection of annual and biennial plants useful for the sub-tropical garden. Annual plants grown usually for their flowers being omitted. Then follows a selection of flowers usually associated with sub-tropical plants, choosing only those that associate best with fine foliage plants;—list of plants for cu-

he ground beneath sub-tropical plants;—trees ubs of remarkable foliage suited for the sub- garden. This is a capital suggestion. Mr on proposed that such trees or bushes as the ig should be cut down annually, whether run ot with the finest foliage, the Lavatera arborea, hus major, Catalpa syringæfolia, Ailantus osa, &c. Then follows a selection of Conifers ociation with flower garden plants; Conifers for training round the same;—a selection irds; ornamental Grasses;—list of Ferns for g away from the fernery;—and of Bog plants uping round the margins of lakes, &c.

ry full description of well classified material, hich our readers could not do better than draw n the pursuit of this style of gardening. The aim of this book, as the author assures us on t page of his preface, has been the selection of suitable subjects, and the rejection of many ve been recommended and tried for this pur- and this work of picking out the best, and g out the worthless, required to be done. An se lot of coarse rubbish has been introduced as e for sub-tropical gardens—much of it no better ir common Docks, and not to be compared with nd Thistles and other weeds. Tropical and have been at times the only qualities needed to a place in this style of gardening. In many s we look upon the author's introductory r as the most useful portion of the book. Here usses the merits and imperfection of this style ening with equal boldness, breadth, and fresh- He is no blind admirer of all that has been ed under the name of sub-tropical gardening, r in the Metropolis or elsewhere. On the y, he condemns many of the limpy groups of which have had nothing to recommend them, at the leaves were fat and big. His sugges- ir mixed groups, irregular masses, single speci- mens on the turf, &c., are excellent. His ideal, as given at page 5 of the Introduction, is in the following terms:—

"Nature *in puris naturalibis* we cannot have in our gardens, but Nature's laws should not be violated, and few human beings have contravened them more than our flower gardeners during the past twenty years. We should compose from Nature, as landscape artists do. We may have in our gardens—and without making wildernesses of them either—all the shade, the relief, the grace, the beauty, and nearly all the irregularity of Nature."

This is certainly aiming high, and the purport of the book as a whole, and of the well and carefully written introduction in particular, is to inform all whom it may concern, by precept, criticism, and example, how to bring their gardens into harmony with that higher style of taste that interests and delights all beholders, and advances the true interest of what Bacon calls the purest of human pleasures. The old landscape gardening dogmas, which tell us we cannot have all the wild beauty of Nature in our gardens, and may as well resign ourselves to the compass and the level, and the defined daub of colour and pudding-like heaps of shrubs, had some faint force when our materials for gardening were few, but considering our present rich, and to a great extent unused, stores from every clime, and from almost every important section of the vegetable kingdom, it is demonstrably false and foolish. And, again, page 28, "Make your garden as distinct as possible from those of your neighbours, which by no means necessitates a departure from the rules of good taste," is capital advice, possibly barbed with a little satire, but never more *apropos* than in this age of slavish imitation and inveterate plagiarism in all garden matters. Without agreeing with the sprightly author on all points, or going the whole way with him in some of the criticisms or proposals, we heartily commend this book, and invite our readers to read it for themselves.

The Garden.

THE HOUSING OF PLANTS FOR THE WINTER.

THERE is a most suggestive proverb, to the effect, "that as we make our bed, so we must lie." With a slight alteration of reading, the meaning of it is most applicable to the housing of plants for the winter. As they are housed, so will they droop or thrive, live or die. Hurry them under glass, dirty, diseased, water-logged, over-potted, with sour root runs, and insect-infested leaves, stems, and branches, and they linger out a wretched existence, or die outright. Reverse all these conditions—see that the plants are clean, the roots healthy, the drainage perfect, the soil sweet, and thoroughly occupied with roots, and that shelves, floor, glass, stages, pots, every accessory is clean and wholesome, and the plants will winter well, and flower beautifully in their season. It can hardly be necessary to dwell on the superlative importance of cleanliness. It is the parent of health at all seasons. But during the energetic growths of summer, the plants can throw off, or resist the stifling action of dirt, by the sheer force of rapid expansion. They enlarge so quickly, and the flood of life flows on so strongly, that the dirt is thrown off or carried away thereby. Not that I want to say that it is not injurious at all seasons, but it is less so in summer than in winter. When the stream of life moves sluggishly, then does dust and dirt draw their smothering veils closely around plants, to the fettering of every vital action, if not the extinguishment of their life. The less vital force, and the fewer stimulants in the presence of light and heat, to rouse it into activity, or preserve its energy, the more careful should we be not to fetter plants with such mechanical burdens as dust of any kind. Let the motto of every villa gardener therefore be—no dirt admitted within our plant-houses. Look for it everywhere on the plants, the pots, under the pots, on the surface of the soil, a great dirt heap in many instances, where dust, Fungus, mosses, weeds, flies, insects, &c., hold carnival, when all else is clean around them, and in every nook or corner of the house. Remember that dust is dirt of the worst sort to plants—that it blocks up their leaf and stem pores, and hinders or stops all their important processes of absorption, elaboration, transformation. It acts as grit between cog wheels, or suffocating fumes on the lungs of animals.

Next to cleanliness, I place a proper amount of moisture in the soil. To house a water-logged plant is to court disease and death. Sour soil will never become sweet in winter. On the contrary, it will become more and more sour and putrid, until it rots every root. Therefore, if any pots feel unusually heavy in the handling, turn the plants out on the palm of your hand, and thoroughly examine them. See to the drainage, and if defective, mend it, and replace the plants into the same pots. Mark pots so as to know them on watering, and mind how you water. They may not need any for weeks. I recommend leaving the old earth if not very bad, as there is less risk in this than in repotting at the dead season of the year. But if the soil is very sour, full of worms and their excrements, it must be removed, that is, as much as possible without breaking the roots, and fresh soil having a larger proportion of gritty sand in it, than would be used at other seasons, employed for that purpose. Also put such plants in as small pots as possible, for nothing is more likely to destroy a plant in winter

mass of unoccupied soil around its

n the opposite extreme of dry balls must
arded against. In housing plants, we
come upon a pot that feels springy and
or its size. Examine all such. You
nd that the mass of earth and roots
the ball has reached a state of dryness
ıting to impermeability. No water nor
fluids can pass through. The water
round or off from its roots, as it
from a duck's back, leaving the
rs dry. Plants housed in this state
inevitably perish. This, in fact, is
ause why so many Heaths and hard-
ed plants go off in winter. They die
irst. Water may be all around them,
e earth and the air, but they cannot
it. The only remedy for these parched
is a bath for ten, twenty-four, or forty-
hours, according to the severity of
rought disease, or the penetrability of
ıll. I have known plants take two days
ıights to soak through; others only a
ours. The weight of the ball, in pro-
n to the size of the pot, a few hours after they are out of the bath, will tell whether they have had enough of it. If not, in with them again, till the whole mass of roots is wetted. Make a note also of such plants; they may need more water than others, or another bath probably before many weeks. Let the second motto, then, be neither too wet nor too dry.

A third very important one, and it is the last I will give at present, is, not to let the plants know they are housed for a time. That is, make the inside as like to the outside as possible, until the plants get used to it. Of course, this only on the supposition that the weather continues mild. Should frost or high winds come, you will doubtless shut them out. But in the absence of these, newly-housed plants can scarcely be kept too cool. The transition should be gradual, easy—a gliding down an inclined plane, not like a leap over a precipice. Plants are mostly housed for safety, not for stimulation. To stimulate plants now is the likeliest of all possible means for making them a prey to the damp and the frost before the winter closes.—*D. T. Fish, F.R.H.S.*

THE PENTSTEMON.

NE of the first candidates for villa gardeners' favour is the Pentstemon. the flower of the million. No one d be, or would be, without his selec- of Pentstemons. I have grown them for a full score years, and have watched with the eye of an Argus. I have ed my household not to cull from the rite batch that I grow in a selected of ground—not a hallowed spot, a piece of the garden where no flower is permitted access to. I have n defiance to the laws of these des and Persians" of farmers and ners, who cry aloud against crop fol- g crop of cereals, or root crops, as the may be. I grow my Pentstemons in my choice quadrangular nook, and I will continue to grow them so long as they reward me with the profusion and quality of their beautiful spikes of flowers. I manure regularly, and in no stinted manner, because I see that the roots can use up and convert into vital fluids the riches of my byre, and send fresh supplies, copious supplies, to be manufactured into large spikes, large flowers, not fragile-looking, colour-wanting flowers, but beauties that I admire, and I don't thank anybody else who sees them, who cannot join me in my admiration. In fact, I am no "meal-and-water" amateur; I am inspired with a certain amount of zeal and earnestness, and I would like to infuse a little of it oftentimes among some

those docile looking, absent-minded men, who have mistaken their calling. I am a business man, driven to my wits' end often to compete successfully with those in the same line, and I admire earnestness, and pluck, and ardour, and demand it too when it is not forthcoming. But I am led away from the subject I took in hand, and I will come back to it at once by naming some of the very best Pentstemons I have grown. I can warrant them as being of the first water, and I give them to your readers in exchange for the valuable information I have got from your pages.

Chief among my selected lot, for I have others growing about in what you call mixed borders, that I pay not quite so much heed to. They are my discarded sorts, and I won't trouble you with them.

Miss Baillie.—Scarlet tube and segments, the latter very large and well formed; throat white with scarlet lines radiating up to base, great size of flower, substance not only good, not only first-rate, but remarkable. Habit extra, spike dense, flowers arranged closely—altogether a flower of first-rate excellence, and therefore every grower should have it.

Stanstead Surprise.—A rosy purple flower, with white throat very slightly stained with purple; dense habited sort, and a very good flower. The colours very distinct, and the white throat particularly so.

Stanstead Rival.—Rosy purple medium sized segments, but of fine form; white ground, throat densely stained with deep purple. It yields a grand pyramidal spike extra for showing, and an extra border or bed flower.

Mrs Peter Cator.—Pale shade of rosy purple, beautifully distinct throat, white with rosy pencillings. The segments are distinctly margined with rosy purple bordering on the white, as if the flower had been of geometric cast.

Novelty.—Rosy lake, grand rose segments, with throat of densest colour of vermillion, toned out towards the base; a most prolific spike of well inflated flowers, good substance, and good in every way.

Henry King.—Good shade of scarlet, very long tube, extra large segments, very good distinct white throat, slightly pencilled with scarlet, very good variety.

Tweedside.—Soft peach-shaded, fine distinct white throat, segments standing well out, of good firm substance; one of the abruptly inflated tubed flowers.

Victor.—Deep tone of purple, very large segments, well formed, and compactly arranged; throat white, stained with purple, habit very dense, good variety.

Painted Lady.—Deep burnished red with well turned segments, throat white, ground colour stained with blackish purple; a very good inflated tubed flower.

Richard Guttermann.—A pale shade of scarlet, tube gradually inflated, white throat with scarlet pencillings shading out towards base, very good grower, having larger ovate acuminate leaves densely set together on the stem.

George Arner.—Blackish purple tube, well inflated towards extremity, segments of corolla of fine form, white throat with dense purple lines, large spike with flowers arranged densely around it.

Agnes Laing.—Rosy purple corolla, with prominent formed segments so well put together, as almost to be overlapping one another, white throat, splendid flower; spike large, and of pyramidal form, well filled with flowers of great substance.

Sophie.—A pale lavender flower of most distinct character, the segments expanding well; throat white, with the broad margin of shaded lavender, a good grower, a fair spiker, but withal a chaste excellent variety.

Delicatissimum.—A flower of white and pure rose in fine suffusion, and therefore of great merit as a variety, the tube is slightly tinged rose, and the segments are shaded at the extremity of rose colour; the flower is not quite so perfect in form as those named above, but it is good and delicate, and chaste among the group.

James Rothschild.—A very rich cast of purple, with a bluish shade pervading it; most distinct and telling; the corolla is largely inflated, the throat is pure white ground, with slight purple staining; the spike is pyramidal, and the whole merits of the

variety make it an acquisition among its class.

W. E. Gumbleton.—A deep purple flower, with a shade of blue, something in the way of James Rothschild, but having a more distinct white throat; it is a better inflated tubed flower than the one to which it is compared, and fully as good in substance; the habit is also fine, and the spike large, dense, and pyramidal.

W. P. Laird.—Shaded purple tube, short, and very prominently inflated, very even and broad segments, pure white throat, scarcely stained with any other colour, an immense flower, and a grand distinct grower, having large sagittate leaves.

Bridesmaid.—A truly chaste flower, nearly concoloured, the white being all but pure. The shade of pink is very pale, and the flower prominenc in tube, and all its parts, consequently, highly attractive, such as would delight a lady for culling from to make up her morning basket of flowers, but too beautiful on the plant to be disturbed. This should be grown by every lover of flowers who has a bit of garden.

Colonel Long.—Fine claret tube, of the richest tone, and largely inflated throat, white, stained with purple segments well formed, and the colouring distinct, from the margin inwards; a grand spiker, and an acquisition to its class.

Rev. C. P. Peach.—Crimson-purple flower, of taking character, flowers well inflated, and segments large and well formed, white throat, slightly stained in regular lines with purple, the colours markedly distinct, and very prominent bearing a fine pyramidal spike, and the flowers densely set upon it.

These I consider to be of the first stamp, and not only villa gardeners, but mansion and castle gardeners would do well if they condescend to grow such humble flowers, to order these sorts. I have no doubt they will have reason to be pleased after trial, that they have done so.—*Pro Bono Publico.*

FRUIT AND FUNGI.

NOTWITHSTANDING the general backwardness of the season, the fruit show held last month at South Kensington, London, was exceedingly good both as to quality and quantity. The display of Grapes, both black and green, was magnificent, some bunches weighing as much as 8 or 10 lb. In this class, Mr Lane obtained the gold medal as well as the first prize, and the public unanimously ratified the decision of the judges. There were also exhibited some splendid baskets of Salwey peaches, principally from private gardens, but none of them were so fortunate as the Berkhampstead Grapes. In Pears, the finest specimens came from France and Jersey; but in Apples the first prize was taken by Mr Willia m Paul, of Waltham Cross. Mr Pau Ribstones were of large size, but still hardl ripe; but the old-fashioned Codlin, a popula favourite, whether hot or cold, had reached a golden maturity. The French sent in some Apples as well as Pears, of enormous size, but they were not considered by the judges to equal Mr Paul's dishes in quality. One exception must, however, be made in favour of the French. The dish of Reines de Reinettes, which had been sent across the Channel, were splendid. Among the rarer fruits exhibited were fine Cherries and surpassing Raspberries, with Apricots, Filberts, and other fruits suitable to the season.

But however attractive to the eye and tempting to the palate might be the magnificent display of luscious fruit in the conservatory, a much more widely diffused interest attached to the collection of edible and poisonous fungi, which was exhibited in the council chamber of the Society. We are very fond of mushrooms in this country, bu

very dainty in our selection, the poisoning cases which occasionally appear in the papers, making the edible fungus almost as much dreaded as the horse radish. In France, on the contrary, the peasants eat almost all sorts of fungi, and in some districts make them a staple article of food. One gigantic fungus which was exhibited is, it appears, brought in cart loads to the southern French markets, and used extensively as a substitute for meat. It is to be found in abundance in the New Forest, but the peasants of the neighbourhood reject it with horror. Another kind, known amongst the expert as the vegetable oyster, might possibly become popular with us in consequence of the scarcity of the marine mollusc. There was also exhibited the poisonous fungus of Lapland, with which, however, the Lapps intoxicate themselves, and a very curious variety, which, although of a bright yellow when entire, assume a deep purple hue the moment it is broken. The recognized poisonous specimens were exhibited on a separate table, but even here it was admitted that what was held to be poison in one country, was looked upon as excellent food in another. The Russians eat all sorts of fungi; the Arabs say, "They are as good as meat;" and the French *chef* makes the champignon the base of nearly all his made dishes. The object of the exhibition was to make the British public and the mushroom more familiar acquaintances, and, as a consequence, better friends; and probably there were few of the visitors who had previously been aware of how much savoury and nitrogenous food they habitually throw away in consequence of ignorance and prejudice. The specimens were examined with great interest, and the attendants were quite wearied answering questions.

NEW AND RARE PLANTS.

CORIARIA SARMENTOSA.

THE cattle-poisoning plant of New Zealand, fig. 1, is more a botanical specimen than a plant fit for introducing into greenhouses. Were it not that it is of a highly poisonous character, we would not introduce it here. Information on plants of that kind is much sought after, and seeing so many of our inhabitants seek a new home and fortune in New Zealand, we thus prominently figure and describe this herbaceous Coriaria. There are others of the same family distributed in the south of Europe, the myrtle-leaved species to wit (Coriaria myrtifolia), and then we have the Nepaul Coriaria (C. nepalensis), which grows into a large shrub or tree habit. With these, however, we take no interest in the meantime, rather preferring to deal with a plant that is so fatal to cattle, and which they seem not unlikely to partake of. This plant, the Toot or Tua-Tutu of the natives, and Coriaria sarmentosa of botanists, is considered to be identical with the C. ruscifolia of Linnæus, which was first introduced from Chili, where it is very common. This opinion may possibly have gained ground by Dr J. Hooker, in his "Handbook of the New Zealand Flora," describing the Tua-Tutu as a shrub 10 to 18 feet high, having stems 6 to 8 inches in diameter, and long flexuous branches. The C. sarmentosa is more herbaceous than shrubby, so that it is just possible it may be distinct from C. ruscifolia. Dr Hooker, however, says that it is often much dwarfed, and frequently assimilates in this respect with the low bush and herbaceous vegetation. Recent reports from Otago and Canterbury record the immense losses of stock in these districts of New Zealand from feeding on the Tua-Tutu; and in a late number of the "Lyttleton Times," great fears were expressed as to the disastrous results which might arise to the vast numbers of diggers then rushing to newly discovered

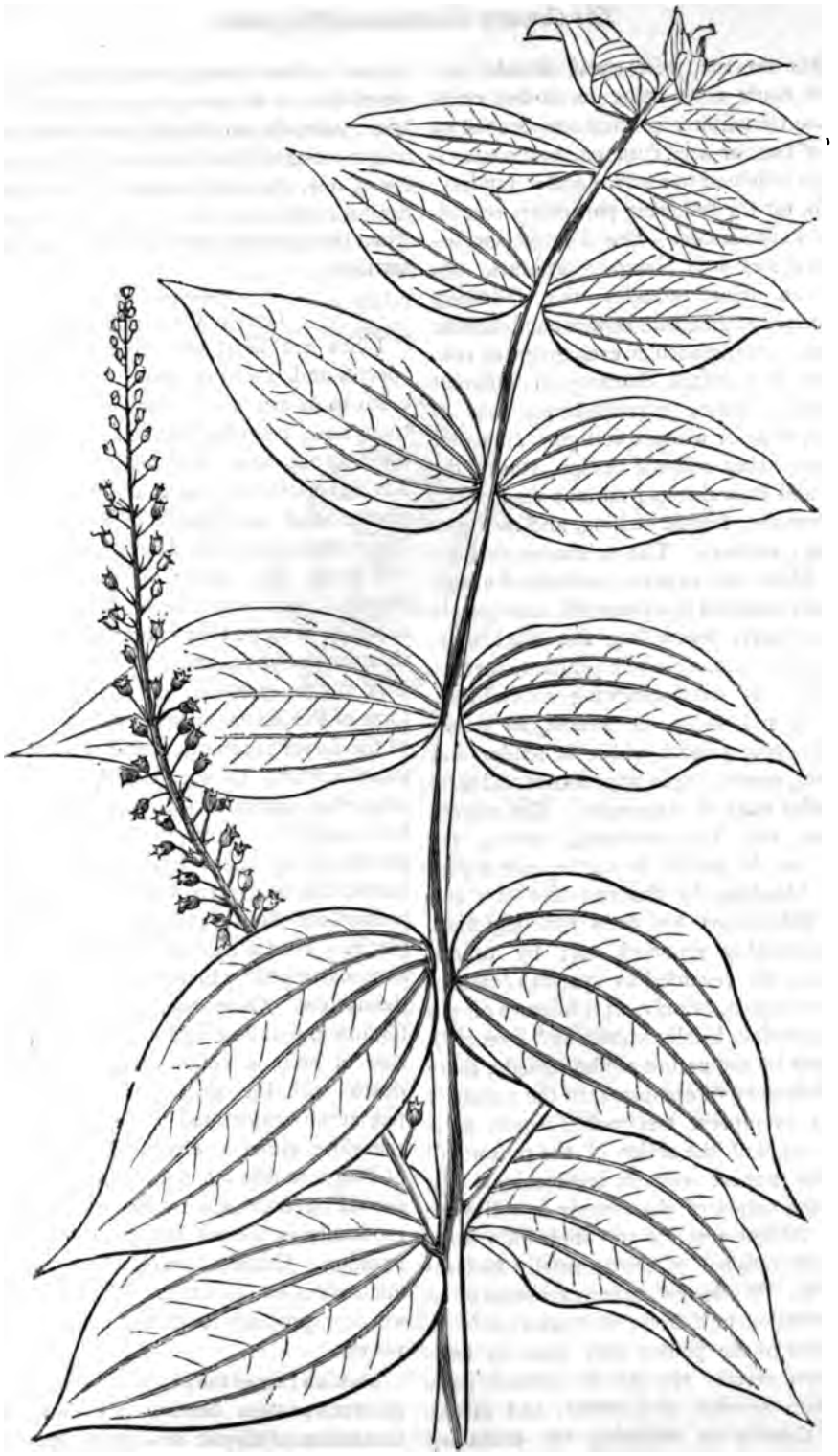


Fig. 1.—The New Zealand Cattle Poisoning Plant—Coriaria sarmentosa (ruscifolia).

gold-fields on the west coast, should the flocks of cattle then being forwarded overland from Canterbury for their support, fall in with the Toot or Tua-Tutu on their route.

We are indebted to Dr W. Lauder Lindsay, of Perth, for the following particulars regarding the Toot-poison :—The Toot-poison belongs to the class of Narcotico-irritants. Its action on man includes the following symptoms :—Coma, with or without delirium; sometimes great muscular excitement or convulsions; the details differing in different individuals; during convalescence loss of memory, with or without vertigo. In cattle and sheep, they include vertigo, stupor, delirium, and convulsions; curious staggerings and gyrations; frantic kicking, and racing or coursing; tremors. The poisonous portions of the plant are, to man, generally the seed which is contained in a beautiful, dark purple luscious berry, resembling the blackberry, which clusters closely in rich pendant racemes and which is most tempting to children. To cattle and sheep, in almost all cases, it is the young shoot which is tender and succulent, resembling in appearance and taste the similar state of Asparagus. The current remedies for Toot-poisoning among the settlers are, in regard to cattle and sheep, mainly bleeding, by slashing the ears and tails. Belladonna has been variously tried, and favourably reported on; by others, stimulants are regarded as specifics (carbonate of ammonia, brandy, or a mixture of gin and turpentine, locally known as "Drench"). Whatever be the nature of the remedy, there is no difference of opinion as to the necessity for the promptest treatment; since, at a certain stage of the action of the poison, all remedies appear equally inefficacious. In man—the nature of the remedy is still more varied, though emetics and stimulants seem the most rational of those usually had recourse to. While certain animals seem to be themselves exempt from, or insusceptible to, the action of the poison they may, by feeding upon certain species, or certain parts of certain species, of Coriaria, and assimilating thereby or secreting the contained poison in their tissues, communicate poisonous effects, or become poisons, to man or the lower animals, to which they (the animals first mentioned) have become articles of diet. Every one, therefore, ought to be more than careful about the subject of our engraving, when they become residents in New Zealand territory.

LILIUM AVENACEUM.

Lilies are most attractive flowers. The species and varieties that we have now in cultivation are very numerous. Some of them have been lost in the rage for window bedding-out, and the modern fashion of having certain new plants and flowers, to the exclusion of many gems of first excellence. No one can grow the Martagon Lilies without being fully aware of their decorative effects; and it must be an object to secure as many of those that come by approach to that wonderfully effective flower as is possible. The one in question, fig. 1, is a miniature form of the Martagon section, but the colour of the flower is tempting, and we feel all the more anxious to secure a variety that is somewhat difficult to keep, with the many; but, under wise cultivation, is easily enough grown by, we might say, the few. All Lilies should not be overcrowded, else they will be pressed out of position by other miscellaneous plants. That is a reason why they should be almost grouped by themselves, and treated for themselves. Otherwise, they are apt to be forgotten, and deterioration of growth begins, size of bulb is consequently affected, and death with the smaller-growing species is not at all uncommon. We would counsel, therefore, either a select bed for a collection of Lilies, or that more than ordinary vigilance should be exercised by the party in charge, especially in the autumn, while the bulbs are ripening. Cutting down the flower stems prematurely is bad practice. With that caution, we now proceed to give a diagnosis of the variety.

This is a Lily of the Martagon section, wholly glabrous; stem bearing a circlet of long lanceolate or elliptic acuminate leaves, eight

to twenty in number—the raceme bearing from one to twelve flowers, with their heads hanging and sepals reflexed; colour, rich orange-scarlet, spotted with black. It is common in Kamtschatka, in the Kurile Islands, and in the Japanese Islands. M. Maximowicz, who collected it on the mainland in the south-east of Mandschooria, and about Victoria Bay, mentions a remarkable variation, a careful inquiry into which would probably furnish interesting results. It seems that about Victoria the flower is orange-coloured and sweet-scented, while the Japanese and Kamtschatkan plants have the flower scarlet, and without odour. It is found in wild situations, on meadows, and in woody places, and may therefore share cultivation with the M. pulchellum tenuifolium and other Siberian Lillies. This one thrives best in mixed loamy soil, without any covering, even in the climate of St Petersburg, as well as in sunny and sheltered localities. It can be propagated by seeds and bulbs.

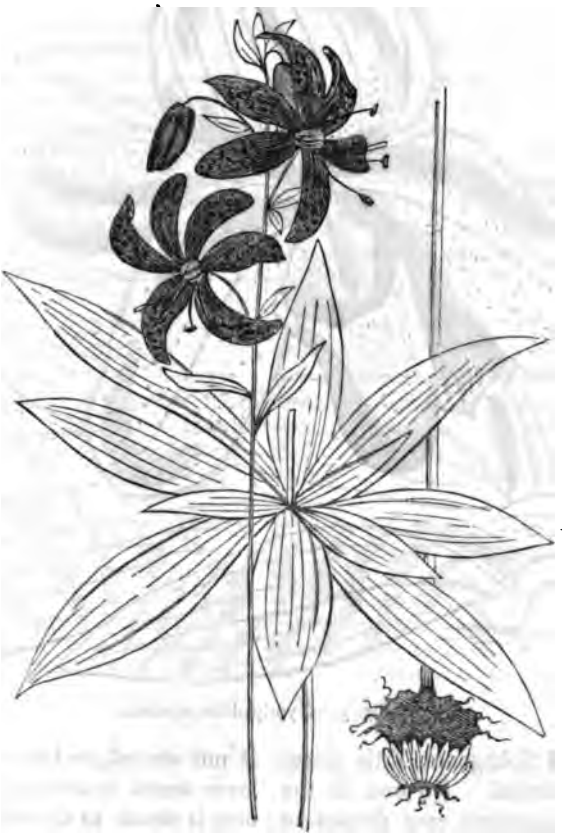


Fig. 2.—Lilium Avenaceum.

CYPRIPEDIUM CONCOLOR.

This is a great addition to the long list of Cypripediums. It was made known for the first time at one of the meetings of the Royal Horticultural Society. The plant is low and stemless, and the flower-scape very short. The leaves are flat, oblong, and channelled, 4 or 5 inches long, mottled on their upper surface, and of a reddish purple underneath. Scape purple and hairy. Bracts large and pointed, one at the base of each flower. Flowers fully 2 inches across, of a uniform pale yellow, sprinkled over with minute crimson dots. Lip forming a narrow

conical pouch. It is a native of Moulmein, where it was found growing on limestone rocks. Although to the untutored cultivator this species may appear to be one of the number of difficult plants, it really is not so. Cultivators who have succeeded best with it find it to do far more satisfactorily among lumps of peat and Sphagnum, little pieces of lime and of charcoal. No one in the felicity of their conceptions ever dreamt of using lime as an ingredient in the compost for Orchid growth, and yet it seems to furnish the kind of conditions along with other material for propagating roots, and for giving them that which they seem to luxuriate upon The plants must not be grown in deep pots; on the contrary, shallow pans are preferable, and they must not be large, but rather small-sized in proportion to the plant. To crush in the roots, and fill up the interstices with the material above spoken of, seems the proper plan. An accumulation of moisture is not wanted, and an unused-up surface or layer seems to act against health. Soddenness is death to the roots; they seem never to be healthier or in a better state than when they are embracing one another and the sides of the pots in all directions. Any one giving due attention to the above hints is not likely to be disappointed.

Fig. 3.—Cypripedium concolor.

Work in the Garden during November.

From "THE VILLA GARDENER."

THE VINERY.

NOVEMBER does its worst to destroy ripe Grapes. Its dark skies and dense fogs are in league to destroy them. As the berries cool down, they act as condensers of vapour, and this hugs the fruit round, as with a wet blanket, to its certain decomposition. It is therefore needful to keep all vineries, where late Grapes are hanging, somewhat warmer than the external air. This keeps the fruit at a temperature superior to the atmosphere, and prevents the settlement of aqueous vapours on to the fruit. Slight fires in the morning, or, indeed, throughout the day, are best for this purpose. With the heat, admit a little air. This will keep the whole atmosphere of the vinery in motion, and preserve the surface of the fruit dry. Sufficient heat will almost certainly be left in the heating apparatus to keep the air 1 deg. or 2 deg. above that outside during the night. Of course, should the sun shine, no fire heat will be needed. But to keep ripe Grapes in safety, a temperature of 40 to 45 deg. is the best. This elevation of temperature is often as useful for leaf and branch as for the fruit. It helps to finish the ripening of the wood. It is impossible to make the wood too hard, or too brown by any process of growth. Perfect, and it may be early maturity, is the secret of certain fertility next year. Those who have no fire heat in their vineries are objects of commiseration during dull wet autumn. Especially are they to be pitied "when cauld November's surly blasts begin to blaw." Then the leaves decay, and the fruit seems to melt away into rottenness. Every vinery should possess some means of heating, if it be only a gas stove, to enable its possessor to preserve his ripe fruit. But if not, there is yet another expedient, the fruit may be cut with a portion of wood attached, and stored, till eaten, elsewhere. Thus the house may be cleared, and the fruit preserved for two or three months. The time of ripening, however, depends a great deal upon the quality of the Grapes. Fleshy juicy Hamburgs will not keep many weeks, while leather-skinned Lady Downes and Alicante will keep as long as you like. Slightly shrivelled Grapes also hang best. We have had Muscats and Muscat Hamburgs slightly shrivelled, bottled for three months. The same Grapes, plump and juicy, will not barely keep so many weeks. But how are they kept? In bottles of water, thus:—Fill a common or soda-water bottle nearly full of rain water, and put a pinch between the finger and thumb (an ounce will do a hundred bottles) of animal charcoal. Then lean the bottle a little over, so that when the Vine branch with its bunch is placed in the mouth of the bottle, the bunch will hang clear of it, so as not to press the Grapes against it. Then cut the Grape branches back within a bud or two of the base, strip off one or two of the bottom leaves, place the base of the shoot an inch or two into the water, and the process is finished. Look over the Grapes once a-week, or oftener, to remove any bad berries, and keep them, as near as may be, in a dry, cool, temperature of 40 deg. to 45 deg. Instances have been given where the Grapes have been hard frozen with apparent benefit, but I do not profess to understand —neither do I recommend—that they will keep safely without much if any deterioration. This is proved by several seasons' practice. The animal charcoal preserves the water sweet, and the texture of such ripened vine-wood is so close that it does not seem to absorb water in excess. Having got rid of the Grapes, a dry atmosphere is still the best for finishing the ripening of the wood. That is all you have to attend to this month inside. Such Vines as we have been writing about need not be pruned till December, but the outside of the vinery should now receive some attention. Examine the roots, and, if needful, add some fresh turfy loam as top-dressing, and protect them from heavy rains and frost:—the first rots, and the second is apt to rupture healthy roots, and there is no need to expose those of the Vine to an excess of either wet or cold. A covering of straw, boarding, or corrugated iron, will exclude the wet. If either of the two latter are used, it is a good practice to place a layer of litter underneath, and this renders the border frost-proof as well. If the vinery is empty and the wood thoroughly ripened, frost will not injure the tops of properly matured Vines. But villa gardeners should avoid all extremes, and it is not safe either to open or unroof a vinery during very severe frosts. In most places, the vineries are stuffed full of plants to which frosts are fatal, and if not kept over 40 deg., no injury will accrue to the Vines in consequence.

THE ORCHARD HOUSE.

The growths ought to be completed and ripened before now. But, if from late planting or other causes they are not so, hasten maturity by wa h: by drought. Dryness at the roots stops

and thus hastens the cessation of growth. In pots such matters are easily managed. But the roots of planted-out trees often strike a rich vein of food, and go on growing and forcing up growth right into the winter. If one could only know where to hit such roots, the shortest process of arresting further extension of top, is to sever them. But if root-pruning is objected to, then dry the whole border as much as possible, by withholding water. But it is needful to guard against the opposite extreme. Plants in pots and in borders, also often suffer from drought in the autumn or winter months. It is a significant fact, that in this country our heaviest rains fall in autumn and winter. When our trees want water least, they have the most of it. The normal state of the roots of fruit trees in winter in the open air in England, is a wet state. We must therefore guard against keeping them too dry under artificial conditions. One of the reasons of bud dropping and shy setting is, assuredly, root drought in winter. The juices of the tree are drained dry, and then the rush of watery sap bounds forward, and carries off buds and young fruit with a rush, as a newly opened sluice carries all before it in a mill-run. One of the likeliest means of preventing this irremediable loss of a crop, is to keep the sap flowing gently at all seasons. Give the roots sufficient water even in winter. Borders may require none, trees in pots several waterings during the month of November, and see that sufficient is given to penetrate the entire mass of roots, without in any manner water-logging them. You must also have a sharp eye for insects. "Insects in the dead season," I fancy I hear Mr Prince exclaim, "It is not to be thought of!" But it must, if you wish for a crop next year. Just you look over those beautiful Peach and Nectarine trees in your orchard house. What are the black lines clustering along against your plump buds? Aphides, I declare. What are they doing? Only eating the hearts out of your next year's fruit, where they are by scores. Dose them with a thick lather of Gishurst's Compound forthwith. Or, better still, brush them off first, and dress the wood afterwards. But see, there are a number of semi-circular brown knots or blisters distributed along the sides of some of your finest shoots, this looks like woody protuberances growing out of the bark. Why, these are brown scales, eating the lining of your plant cases through, or fixing themselves like innumerable vices along the surfaces of life and growth. Brush them off with strong soap suds, and paint all your wood over, as a suffocating measure for bug, scale, and other insects, with a thin paint composed of equal parts of clay and cow dung, in lieu of lead, and strong tobacco water instead of oil. This will smother the baby scale in their invisible beds, and probably send any prowling aphis that has escaped destruction, by taking to its wings, away in disgust in search of cleaner quarters. Finally, give ants no quarter; there will not be many about in winter therefore winter is the best time to exterminate them. Kill every one you see. It is all nonsense about ants living on aphides and other insects. They distribute them, if not increase them. Certain it is, the more ants the more aphides, and they consume choice fruits wholesale. Scatter guano over their runs, pour it as a thick paste into the nests, scald them with boiling water if you can catch them beyond root range, and pour on them with treacle and arsenic. You will have neither peace nor comfort, nor any perfect fruit, if you once allow ants to gain a footing in your orchard house. Be sure also to keep out birds. It is very pleasant to see and hear them chirruping away among your orchard house trees, but they will reward you for your shelter by feasting upon the tree buds. Also keep out severe frost, especially from the roots. The latter is easily done by a covering, a few inches thick, of Fern leaves, straw, hay, moss, cocoa-nut fibre refuse, or mats. The dryer the covering, the more frost it will keep out, and *vice versa*.

THE GLASS HOUSE.

As winter approaches, the glass house grows daily in importance. A short month since we could cull handfuls of beauty anywhere. But now the garden is bleak and bare—with here and there a battered Michaelmas Daisy, or a sprig of Laurustinus, looking up pale, or blushing as if frightened, from its cushion of green leaves. These are the scant gleanings of the harvest that is gone. And now comes the tug of war upon the glass house. It has to supply all demands—flowers for button-holes, bouquets, vases. And as it is the perversity of human nature, or a mere hallucination of those who are driven to their wits' end, to make the flowers hold out for all purposes, that the fewer flowers, the more are wanted. The demand rises to a maximum as the supply sinks to zero. It seems even so over November in some well-known establishments. Above the sweep of the storm, and on the sharp heels of the frost, the cry for more flowers, and oftener, comes. Well, the glass house or houses must do all it can to suit and supply these demands, though they sometimes seem most provokingly unreasonable. Chinese Primroses, Scarlet Salvias, Chrysanthemums, Camellias, Coronillas, and a few plants of late Pelargoniums are perfect god-sends in November, and with ample bases of green leaves can do marvels of furnishing. Chrysanthemums alone form a gorgeous winter garden of themselves "to the manner born." But unless skilfully intermixed with other things, they are so wintry-looking that one seems to feel the keen winds, see the snow driven, and hear the hail rattle, as we look at them. But flame them up with a few plants of Salvia splendens, and the case is altered wholly. But I must not stay to arrange the glass house, but hasten on to give instructions concerning the exclusion of frost, and the careful watering and ventilating of the same throughout the winter. Never let the temperature fall below 40 deg., nor raise

t above 45 or 50 deg. with fire heat. In watering, see that the water falls on the soil only, and that none of it is splashed about our pots, paths, or stages. The great enemy of the glass house in November is damp. It is worse than frost itself. For one plant that frost kills in winter, damp destroys its thousands. Let us therefore only water the soil when it absolutely requires it, and keep the air dry. A moving atmosphere, by an exchange of air between the outside and the inside, is favourable to this dryness. Still, when the outside air is steeped in fog, keep it out. Better a still and stagnant air within your glass house, than one of almost equal parts of air and water. Hence it is safer not to admit any of the outside air for a week, than to sweep a saturated atmosphere, cold or wet, over our favourites.

Pick off every damped leaf or flower, these clinging to the stems cause decomposition ; they are very unsightly, and reveal that worst of faults in care, want of thought or care, or both. Give the choicest plants the best places, if there is a choice of place, in the glass house, mostly packed in villa gardens for the next four months like the hold of a slave ship for the middle passage. Indeed, this passage from the shades of winter into the gleams of spring or early summer is almost equally full of horror to plants. It taxes their powers of endurance and our patience to the utmost. May our readers' skill rise to the task of carrying their living cargo safely through ! To this end note the hints already given, and also these two :—No excitement for the next two months, and no excess in overcrowding. Also a place, however small, for everything, and everything in its best place ; and the most delicate plants in the choicest places. As a rule, too, the smallest should stand nearest to the glass. Over-shadowing means death to most tender things in winter. This is often wholly overlooked by villa gardeners. If they can only thrust their pots in anywhere under glass, they think all will be well. There never was a more fatal mistake, plants languish and perish unless cheered by the sun, or his light—the eye of the day.

PITS AND FRAMES.

All we have written concerning the glass house is applicable to these. Our summary of work for the month here also is—Let in the light, keep out the damp and the frost. No easy matter now, when light is at a discount, and moisture superabounds, and the means of drying up damp in pits and frames are mostly absent, and nearly always totally inefficient. Pits, hot or cold, that have a pipe or flue run through them, are easily enough kept dry. Heat absorbs or drives out damp. And even a brisk lining of hot dung applied to the sides of the pots will dry up the greater part of the moisture within. In the absence of any source of heat, covering the surface of the glass with dry mats prevents the condensation of water on the glass, and this is efficacious by preventing one of the greatest sources of damp—drip. The only gleam of sunlight or current of mild air, must be utilized for the disposal of damp. Let the air and the sunlight into pits and frames freely, and they will carry away much of the moisture that would have produced decomposition.

Hot Pits.—Place a few early Hyacinths, Tulips, Lily-of-the-Valley, Deutzias, and Persian Lilacs into these, and maintain a sweet growing bottom and surface heat of 55 to 60 deg., and you will be rewarded before Christmas with some forced bulbs and other flowers. Nothing is so charming in winter as the sight and smell of some of these sweet children of the spring. Water such plants with water at 65 deg., and sprinkle the top occasionally with the same. Let them feel the benefit of a spring morning in April, and the quickening warmth of an April shower. Cover warm pits with care. Some villa gardeners will like to devote a warm pit to the growth of early Radishes and Potatoes. These can be prepared or sown this month ; 50 or 55 deg. is heat enough for these ; keep the Radishes within a few inches of the glass, and the Potatoes within 6 or 10 inches of it ; cover the frames carefully. Little water will be needed for the Radishes, and none for the Potatoes for a month.

Cold Pits and Frames.—Many will have to store their bedding plants, and keep such things as Auriculas, Carnations, Calceolarias, Cinerarias, &c., in them. The first cannot be kept too cool, if not too severely frozen. On the contrary, Cinerarias and such plants should never touch a lower temperature than 40 deg. When cuttings are stored for the winter in cold pits, they can hardly be kept too dry. On the verge of flagging, is the safest condition till January.

THE FLOWER GARDEN.

Finish clearing, digging, and winter furnishing. The spirit of every-day cultivation has not only entered but possessed our flower gardens. That spirit may be thus embodied—always under crop. Empty beds, borders, fields, proclaim a waste of force, space capacity. Would you stop that waste? Fill them with something beautiful and useful. There is a satisfaction in their being filled. The consciousness of occupation sufficeth for the present. The crop may be invisible as of bulbs or seeds, but there is beauty, I had almost written, certainly a pleasure in the fact that there is a crop. The autumnal and winter cropping is in many gardens a heavy business. Shrubs, herbaceous plants, bulbs, annuals, are mostly used. Villa gardeners may crop with the same materials, though necessarily on a smaller scale. It is astonishing how well a few shrubs, such as neat plants of Laurustinus, Hollies, Aucubas, Box, Berberis, tell at this season. They furnish at once with size as well as beauty. Next to shrubs, perhaps Chrysanthemums are the most useful for immediate effect. Those either grown dwarf on purpose, or

pegged down so as to cover the beds, lighten them up at once with a glow of beauty equalling in brightness the summer display at times; and villa gardens are rare places for Chrysanthemums. They seem to revel under the shelter of villa walls, and to wax fat and grow beautiful by consuming the smoke of villa residences. A rare old plant for villa gardens in winter is the Chrysanthemum, of all sizes, forms, and colours. Other plants are Christmas Roses, Forget-me-nots, Violets, Primroses, Dwarf Phloxes, Arabises, Aubrietias, Daisies, &c. These should now be planted in masses, patches, carpet patterns, or rows. And then among Bulbs, what a wealth of floral beauty for winter and spring furnishing is found among Crocuses, Snowdrops, Anemones, Aconites, Hyacinths, Narcissuses, Tulips, and then the Californian and other annuals, of which we have given lists, come in to fill up all vacant spaces, and crowd the ground with beauty and variety. When all are planted, mow the grass over once or twice, clip the edges, clear gravel, and roll the grass smooth for the winter. The garden will then have the charm of cleanliness, and the interest that only springs of good keeping.

Roses.—Prepare ground by deep trenching and heavy manuring for growing Roses, collect and plant Briars for budding; make up blanks in Rose beds, and mulch the roots with 6 inches of rich juicy manure for the winter.

Prepare ground for planting shrubs, and finish planting all deciduous trees and shrubs this month. See that all freshly transplanted plants are kept firmly in one spot by strong stakes. No plant can root if the top plays see-saw with every wind that blows.

Herbaceous borders should be manured or top-dressed with fresh earth, pointed or flatly dug over; all rough plants reduced, weakly ones encouraged and increased; the plants fresh labelled, and replanted and re-arranged if necessary, and the whole prepared for a safe wintering and a vigorous start early next spring. No herbaceous plant should ever be planted without a strong stake or label to indicate its whereabouts for ever afterwards. The want of such landmarks has wrecked myriads of the most beautiful plants in flower gardens and borders throughout the kingdom.

THE FRUIT GARDEN.

The last of the fruit must be safely garnered early this month. It is a tempting of the elements to leave it longer abroad. The frost must no longer be trusted, and no fruit is improved by being wreathed round with snow-drift or battered with ice pellets. Fruit needs a good deal of attention immediately after it is gathered; the change from the outside to the inside tests its keeping capacities considerably, and all imperfections soon reveal themselves in the fruit room, therefore fruit should be looked over almost daily for the first few weeks after storing. Every bruised and specked specimen must go into the immediate-use shelf, before it has time to infect the sound fruit; after a few weeks these blemishes will reveal themselves, and the fruits need less care.

Plums.—Such as Golden Drops and Imperatrice—may be kept for several weeks, sometimes months, suspended by the foot stalks, these make a wonderful change for the dessert when the late Peaches are over. All fruit, but especially Pears, require gentle handling. Many of the choice sorts are thin skinned, and it is hardly too much to add that if the skin be bruised ever so slightly, the fruit decays.

Plant Fruit Trees and Climbers of all sorts.—November fogs are sent as a wet blanket to recoup newly planted trees from any loss of sap sustained in the process of removal. Evaporation from living surface of bole and branch is almost *nil*. Therefore this is the time, above all others, for transplanting old and planting young trees. All such work ought to be completed by the end of this month.

Prune all hardy trees, such as Cherries, Plums, as soon as the leaves fall, and train the same during mild weather. The pruning of the more tender trees must be deferred till the spring, and for these reasons—early pruning means early blossoming; and early blossoming risks the loss of the crops as spring weather had done last year.

Small Fruits, such as Gooseberries and Currants, are often left unpruned till February, for the same reason—to keep the embyro fruit as late as possible. There is also another reason for deferring the pruning of these fruit bushes. The more wood left for the winter, the more chance of buds escaping the birds to yield a crop next season. Pruned or unpruned, it is, however, good practice to use November fogs as fasteners for showers of soot, lime, or other hot dust, to protect the buds from the hungry birds.

Raspberries may be pruned and trained now. They hardly ever break too early for the season, and the birds seldom make much havoc with them.

Strawberries may receive a winter dressing of 6 inches thick of good manure. This will feed and protect the roots at the same time, and send up rare strong fruit stems next June.

Root Pruning.—When necessary, proceed with during the month. The sooner it is completed the better.

Remove loose bark, route insects out of nooks and crannies of walls and of trees, remove all dead ties, scrape or wash off American blight or scale, dressing the affected parts with train oil, and paint the stems of fruit trees infested with Moss or Lichen with a paste formed of equal portion of quicklime and soot.

THE KITCHEN GARDEN.

Cropping.—Yes, to be sure! Put in your first crop of Peas, Carter's First Crop, or, if you prefer dwarfs, Beck's Gem or Tom Thumb. Wet the Peas, and roll them in red lead, then sow them thin on the warm

s, in drills 4 or 6 inches deep, and fill
ver the Peas, with furze or whin chopped
s to bother and baffle the vermin of all
imy slugs to sharp-toothed rats.
'eans.—Treat in the same way.
Advancing crops of Hardy Hammersmith
may still be planted under protectors.
vay in these all the winter.
; *&c.*—Place these under hand lights.
surface soil among them, sprinkle with
estroy slugs.
crops of *Lettuces* and *Endive* under
y now be left to take care of themselves.
ed no air, and if kept dry, no frost will

ontinue to earth up, cover the ridges
ake up and store, as wanted, a week's
ler or cellar.
'heren Brocoli or *Cauliflower.*—Look
all that are fit, every other day.
—See that the frost does not throw them
'ound, nor slugs consume them on mild
cession crops may still be planted.
'ea Kale and *Asparagus.*—Take up a few
ie, and bring on in cellar, stable, or any
or in a hot pit or frame. The Asparagus is best grown in the light, the other two in the dark. A temperature of 60 deg. will bring them on nicely, or they may be forced under pots out-of-doors, encased round with a foot or two of hot dung or litter.

This is the season for all such radical measures as drainage, trenching, double digging, rough ridging, and heavy manuring. The earth, however, should never be moved about in a wet state. It is even worse to wheel over wet earth. It utterly ruins the texture, and hardens and sours the tilth of gardens. By taking time by the forelock, and being on the watch for opportunity, suitable seasons may generally be found for all the needful operations in gardening. The grand secret of success is always to take the first chance that offers. The sooner all earth is turned up to the air the better, and the weaker the root run it will form next season. If you get your manure on now, dig or trench at once, and run the dung on when the frost comes, and dig again afterwards. Never let the earth lie in dung, because it is too soft to bear the carriage of manure, nor puddle it into sourness by making it carry loads in a wet state. If time and opportunity offer, and the manure is ready, on with it at once. But if not, up with the soil, and on with the manure during frost.

The Veterinarian.

CLICKING OR FORGING IN HORSES.

THERE is scarcely any habit to which the horse is liable which becomes so annoying to the experienced rider as that of "clicking," or, as it is variously termed, "nicking," "forging," "hammer and pincers," &c., particularly when in some instances it appears to have settled down into a most obstinate and chronic condition, and defies all the arts known to the owner against its removal.

In consulting the various means recommended for its removal by many prescribers, we are first reminded of their numerical strength, and, secondly, that the fault lies entirely with the animal's will. Nearly all the authorities who give an opinion upon the matter recommend the application of whip or spur, or both. We almost believe some consider the animal to be asleep, for, say they, "you must wake him up," and the means are by sticking the spur into his flank, in order to induce him to move the hind legs more rapidly. The cure, or rather removal, of the habit does not depend upon such means, for the cause is really due to the fact that the movements of the hind limbs are already *too quick and too long* as compared with the action of the fore. But this anomaly arises from different causes, and it is as inhuman to whip and spur the horse for the habit, as it would be to bleed the rider as a means of cure. In some instances, the rider might be benefited by a horsewhipping, but care is required in diagnoses of all cases, in order that the treatment may be appropriate.

Young horses are commonly prone to forging. This is due to a want of education, in which muscular weakness may assist in some part; but, as a rule, there is a want of harmony of action, the fore limbs are raised too slowly, while the hind are thrown forcibly forward, covering too large a distance, and which results in the toe of the hind shoe being violently brought into contact with the lower surface of one or both branches of the fore shoe as soon as it is raised from the ground, being then almost in a vertical position. Horses having no shoes on do not click or forge. It is the striking together of the iron surfaces, and the magnitude of the sound is increased in proportion to the amount of surface struck. But there are other causes which induce the habit. In young horses, the weight of the rider has much to do with its production, and also the pace at which he rides. We saw a "breaker," some time ago, driving in his skeleton break a young mare. He knew she could not trot very fast, and evidently was pushing the animal to the utmost extent of her speed and strength, while he was deaf to the disagreeable sounds which arose from the forging of each foot. A slower speed, with careful handling, and patience while proper strength is acquired, would remedy these matters; but the breaker desires to work quickly, and delivers the animal "tamed" to its owner, with half its education yet to receive. With regular work and watchful care, suitable food, and other means to acquire health and strength and condition, the habit vanishes.

Older animals perpetrate the annoyance under bad riding and driving, and when both have become confirmed, having grown together, complete reformation in management is often required before he is satisfactorily used. Some animals also suffer from a decline of muscular power in the extensor muscles of the fore-limbs, which, occurring

ds the end of a journey, gave rise to forg- Here, also, some amount of care and leration is required, and the humane or driver will at once either slacken or otherwise ease the animal, for he will d it as a sign of debility, which may cost a pair of broken knees, and possibly in ugly fall. Clicking or forging may, early all cases, be removed by good gement and care in feeding and work; where persons do not study either, and

Fig. 1. Fig. 2.

Fig. 3.

determined to have a remedy to save their g into such an abstruse question as the nce of "horseology," as a quaint old id of the old school chooses to name it, farrier adopts a modified form of shoe to t the case. The remedy is also usefully lied to all animals which practise the t, in order to save the ear from an annoy-, until the action has improved, and a er style of going is secured. The form ind shoes employed are shewn in the e woodcuts.

In order to apply the shoes with success it must first be ascertained where the animal strikes. Sometimes both branches of the fore shoe are struck, at others only one, and the application of the wrong shoe has been known to increase the habit, and bring disgrace on the remedy. If the horse is taken out for a trot, the farrier, standing behind, will be able to perceive the course of action. The fore shoe also may bear the marks or punchings of the hind; but if none of these succeed in affording intelligence, the front of the hind foot may be blackened or chalked over, and after a brisk trot the surface dressed will shew where the marks are made. Choice is then to be made of the requisite shoe. If one branch only of the fore shoe is punched, a shoe (fig. 1) having a square toe with clips at the corners, is to be put on: when both branches are struck, the shoe, fig. 2, provided with a triangular toe, the clip being in front, is then needed.

In the application of the shoes, the farrier must not be allowed to cut away the hoof in front. In each case it must project over the hoof, as shewn in fig. 3, so as to act as a cushion on which to receive the blows in action, and deaden the sound. It is advisable to set back the shoes as much as possible, by letting in the clips. In other respects, the shoes are made as for ordinary purposes, and when properly applied are always successful. The fore shoes never need any attention for this habit. The old idea that the length of heel was the cause, is now known to be a fallacy, as the ground surface generally shews the indentations caused by the repeated blows of the hind shoes in action. If, after these means are adopted, the animal continues to forge, it is certain that neither the proper injunctions have been observed, nor is the requisite care in management bestowed.

INJURIES TO THE CORONET—TREADS.

THERE are few conditions of a morbid nature that give rise to more suffering and acute lameness than injuries to the coronet.

We may explain, for the benefit of the uninitiated in these matters, that the part named is that somewhat full and rounded border surrounding the top of the hoof—it is the junction of skin and hoof, and also the cushion or pad containing the organs that secrete the hoof. The hoof, therefore, grows downwards, and this fact, together with those immediately preceding, will be usefully borne in mind as we proceed in our description of foot diseases. Numerous blood vessels and nerves are likewise present, as in all parts where active secretion is required, and, in consequence, when an injury is inflicted intense pain is very speedily set up; severe hæmorrhage if the skin is divided, and active suppuration when the tendency to the formation of abscess is occasioned. The pain is considerably augmented as a result of the extensive motion of immediate parts which facilitates circulation, and determines a greater quantity of blood towards that affected. Besides, the animal has to support weight, and the limb being lower than the body, the weight of the column of blood acts as an additional cause for intensifying the severity of the suffering.

Injuries to the coronet are easily inflicted, as the prominent position it occupies, particularly in the fore extremities, renders it more exposed to the possibility of being bruised during progression in turning round, &c., by the opposite foot. The shoe, especially when supplied with calkins, and sharpened or roughed in frosty weather, will sometimes inflict very ugly wounds; but from experience we are inclined to asservate, the shoe or the calkins are seldom to blame so much as the person who has charge of the horse. The way in which some drive and ride, and turn the corners of our streets, not only produces such injuries, but the surprise is greater in being unable to form an adequate idea why they do not arise more frequently, and even more severe.

At the time the damage is inflicted, the animal will probably not even wince or exhibit the least indication of lameness. But if he has far to walk, and especially when the weather is cold and frosty, he is dead lame before he reaches home. If he speedily arrives at the stable, nothing may attract attention before being left for the night. His supper is taken as usual; but on the morrow the attendant finds him standing on three legs; he refuses to partake of any breakfast, but from the feverish state induced he may drink water rather greedily, and shortly commences to breathe rapidly and with somewhat of difficulty.

The end of such cases is variable. Local abscess may arise, and destroy much of the secreting cushion; or, as in more rare cases, the foot may slough off. The latter is more commonly the result of extensive and serious injury from heavy weights, as the wheel of a cart or other vehicle passing over it. Abcess, again, produces more or less destruction to the hoof; it is therefore necessary, under all circumstances, to arrest the inflammatory action as quickly as possible, by which much suffering is mitigated, and the evil consequences materially subdued. Defective hoofs occasioned by abscess in the coronet reduce the value of horses considerably, as their usefulness is lessened if not destroyed. For the purposes of cure, various means are employed. Cooling medicines, as aloes, epsom salts, or nitre, are given, and the foot is enveloped in a hot poultice, plunged in hot water, or surrounded by several layers of flannel loosely wrung out of hot water.

When the inflammation has been subdued, a cooling lotion is then employed, or the parts are dressed frequently with tincture of myrrh. The upper edge of the hoof then

requires to be reduced by the knife, to avoid pressure on swollen parts, and sometimes the burrowing of pus beneath the hoof downwards, necessitates entire removal of a portion of the wall; and such a state, probably, will be the commencement of a long period of delay, during which the animal suffers very much, and after recovery proves of little service on the roads. A more recent method of treatment consists of using severe astringents, as the salts of zinc in solution, such as the chloride or sulphate; some practitioners use strong alum water with one-fourth part of tincture of myrrh. Carbolic acid proves of great service; but, in accordance with the tenor of the old proverb, "a stitch in time saves nine," we counsel our readers to secure early professional aid, in order to avoid the serious evils occasioned by delay.—*J.*

DISEASES OF THE FEET IN CATTLE AND SHEEP.

FOOT-ROT AND THE FOUL, ETC.

IN a close examination of the consequences of injuries to the coronets or upper portion of the feet of horses, and contrasting them with identical occurrences in cattle and sheep, we are reminded how different are the effects of surrounding conditions in their operation upon like structures. For it is really in the difference of external agencies existing in connexion with the various animals which develop what appear to be opposite maladies. There is, however, essentially little difference in the nature of injuries to the coronet of the horse, cow, or sheep; the course of the disease is modified by other causes. An abscess arising about the top of the hoof in the latter animals seldom receives the same notice and treatment as when the like takes place in the same part in a horse. On the contrary, dirt continues to adhere and obstruct a free flow of pus, it also irritates the sore and aggravates the disease, giving rise to the increase of discharge and destruction of parts until bones are deformed, joints destroyed, or the limb becomes a hideous mass of disease, while the creature suffers considerable loss of condition, and not uncommonly dies in consequence.

Besides injuries to the top of the hoof, which cause the diseases of the feet of cattle and sheep, to which such senseless names as foul, loo, low, and foot-rot, are given, there are others that act with great power and certainty.

Among the most common causes are thorns, splints, dirt, stones, gravel, &c., which, becoming inserted between the digits, or allowed to penetrate at the junction of hair and hoof, set up a deal of inflammation. When the animal becomes foot-sore, the exposed surfaces suffer irritation caused by the insinuation of similar particles, and each alike gives rise to suppuration and destruction of tissue. When the hoof grows too long, an unnatural strain or leverage is produced, which causes portions to break or split off, and expose the sensitive parts beneath; and animals allowed to occupy wet pastures or straw yards under deluge, especially the alkaline water produced by admixture with the drainage from dung-heaps, urine, &c., suffer from a softening and partial solution of the hoof, which renders it unfit to support weight, it breaks down and ceases to afford protection also, and under each condition the presence of dung and dirt, with insinuation within the exposed raw surfaces, are all that are needed to intensify the malady and produce inconvenience and loss.

FOOT-ROT AND FOUL ARE NOT CONTAGIOUS DISEASES.

In proportion to the observation we make on this point, so are we convinced of the fact

above stated. These diseases prevail in accordance with the operation of causes, and those are they which we have already detailed. If the first signs are properly made out, and appropriate treatment with necessary care and cleanliness are adopted, every case would be as readily cured as the like complaints in horses. But many farmers, as well as their shepherds, believe that nearly all the importance of diseases as foot-rot, &c., must be lost when divested of their mystery, and they would rather maintain the appearances of profound knowledge in dabbling in dressings and surgery, than attempt to remove the causes from the animals, or the animals from the causes. It is easier to dress and cut the feet than study the nature of soil, or modify the system of stock management consistent therewith, and therefore the evil greatly continues. However, we hope for better things when the inculcations which descend *ex cathedra* in agricultural teaching schools, are estimated as necessary to the farmer's education.

In the treatment of foot-rot and foul, the most scrupulous cleanliness is required. Affected animals should be removed to dry and clean quarters, and there undergo a systematic examination. The removal of dirt, sand, &c., should be speedily effected, together with loose horn and fragments, under which pus burrows, or is likely to do so. Hot fomentations and poultices are excellent things when they can be applied, but in their absence, the feet should be bound up with the proper dressings and bandages, which not only promote healing action, but *prevent* the access of dirt.

As to the choice of remedies, there need be no loss. If the directions already given are strictly followed, there is no better remedy than the simple tinctures of myrrh or benzoin, or the compound tincture of myrrh and aloes. Many use caustics mixed with tar, which we recognize as agents which compel nature to slough off parts that should be removed by the knife or poultices, &c. The treatment of these diseases is very simple, and the cure not difficult where good management and a proper system are acknowledged, but when the exciting causes are allowed to go on unmolested, foot-rot and foul becomes as difficult to arrest as a highly contagious fever.—*J.*

CATTLE DISEASE IN IRELAND.

WHILE so much attention has been directed to the importation of cattle ses from Continental countries, it would ll if we were equally heedful with regard e existence and prevention of disease ı our own borders. There is little room ubt that if the importation of stock from n countries were prohibited—except as are fit for immediate slaughter—we l be enabled to keep our home-bred in a more satisfactory condition, as re- health, than we do at present.

land is the great home nursery for cattle, and the health of Irish stock is ore a matter of the deepest interest to sh and Scotch farmers. That foot-and- ı disease exists to a great extent in ıd is probably well known, and many t outbreaks of the disease in Great n have been distinctly traced to Irish

It is probable, however, that very nong us are aware of the actual extent sease among the cattle of the sister ry at the present time; and as this is ason at which farmers on this side of hannel lay in their supplies of Irish to be fattened during winter, we have lered it our duty to institute certain ies into the actual state of matters, the of which will be seen in the course of llowing remarks. We have considered inquiries needful, from the circumstance he Irish Government do not publish ıformation on the subject, and, for the part, it is only from stray paragraphs in ıewspapers that some scanty information e gathered as to the spread of disease ferent parts of that country.

actly two years ago, foot-and-mouth e broke out among cattle in a north- n county in Ireland, the origin of the se having been traced to certain Alder- cows which had been imported from nd. The disease gradually spread southwards, and during the early part of last year it was very prevalent among the dairy cows in and around Dublin. In the course of the summer, it went to the southern counties, especially Tipperary and Limerick, and caused considerable loss to the dairy farmers in those districts, from the interruption it produced in the butter manufacture. The mortality, however, was slight, and gradually the disease became eradicated, owing, in a great measure to the steps taken by Professor Ferguson, Her Majesty's Veterinary Surgeon for Ireland, who has the superintendence of the Irish Government Veterinary Department, with the entire public and constabulary force in Ireland at his service.

During last spring, Ireland presented a clean bill of health, not alone in respect to foot-and-mouth disease, but also pleuro-pneumonia and other contagious diseases. It was not destined, however, to remain long in that state. Although Ireland sends us annually large numbers of store cattle, she also imports calves from England, to supply, in some measure, her own deficiencies in the production of cattle. Several lots of imported calves were taken inland during the early part of last summer, and sold in certain country fairs. These calves appear to have been affected, for wherever they went they spread foot-and-mouth disease. Since that time, it has gone like wild-fire over the country, until there are very few parts which have not been visited by it. The disease is also of a more virulent nature than it was last year, and it has been accompanied by a considerable amount of mortality. Hitherto it has been generally held that cattle which have got over an attack of foot-and-mouth disease were exempt from it afterwards, but the experience of this year has shewn, in Ireland at least, that there is actually no such exemption. There may not, perhaps, have been a sufficient number of

cases to establish the liability of once-infected cattle to a second attack, as a rule; but these have been quite numerous enough to shew that cattle which have been once attacked by the disease and got over it, may be again affected if brought in contact with animals labouring under the disease.

But it would appear, from certain cases which have occurred in the course of this year, that even contact with diseased animals is not always necessary to produce disease. We have been informed of one notable case which illustrates this. In one of the midland counties there is a lake of considerable extent, and in that lake there is an island upon which cattle are pastured during the summer and autumn months. The island is situated at some distance from the shore, no fresh cattle had been taken to it for some months, nor was there any case of foot-and-mouth disease, at the time, within 20 miles, yet in spite of all those safe-guards, as we may call them, foot-and-mouth disease broke out in a virulent form among the cattle pastured on that island, certainly a very mysterious occurrence, but one which the records of the veterinary department in Dublin Castle shew to be a fact.

It has been asserted that hares are capable of carrying the infection of foot-and mouth disease from one farm to another. Some have expressed doubts on this point, but of late hares have been found dead in Ireland, evidently from the effects of foot-and-mouth disease.

At present, we are given to understand, there are nearly 7000 places in Ireland under restriction, in consequence of the foot-and-mouth disease; and from various circumstances which have come to our knowledge, we suspect that many cases of disease occur which are not reported to the police. There is a strong disinclination manifested by many farmers in Ireland, to acknowledge the existence of any kind of disease among their live stock when such occur, and they will resort to every means within their power to keep it quiet. We have even heard of instances where a diseased cow was hid from sight in the room in which her owner slept! Nor are the poorer class of farmers much to blame for endeavouring to evade inquiry, when they see others higher in social rank doing what is much the same thing.

In the early part of this year a few persons connected with the cattle trade formed an association in Ireland which was called the "Cattle Defence Association," but which would have been more fitly designated the "Cattle Jobbers' Defence Association," and its only object was to oppose the Orders in Council issued for the treatment, and, if possible, the suppression of contagious diseases. A few simple-minded country gentlemen were induced to give the influence of their names to the association, but otherwise it possessed no weight whatever. The members, however, formed themselves into a deputation, and waited on the Lord Lieutenant for the purpose of insisting that his Excellency would put all the Orders in Council in the fire, and allow them to go as they pleased with their diseased animals. They found, however, to their great chagrin, that in Lord Spencer they had "caught a tartar." His Excellency understood the matter as well, and better, than they did, and he read them a lesson from which they never recovered, for the Association immediately thereafter collapsed.

With the exception of foot-and-mouth disease, we learn that there is no other contagious or infectious disease at present existing amongst cattle in Ireland. Pleuro-pneumonia seems to have disappeared. A number of sheep have been affected with foot-and-mouth disease, and it has proved fatal in several instances amongst that class of stock, and also amongst swine. Fewer cases, however, have occurred of late among sheep. The malignant disease known in Ireland under the name of "red soldier," has been very fatal among pigs. There does not appear to be any remedy for it, and the flesh of swine affected with it is quite unfit to be used as food, either by man or animals.

As it certainly would not be advisable to avoid purchasing Irish store cattle, we would

suggest that all such cattle should be kept by themselves for at least fourteen days before they are allowed to mix with other cattle on any farm to which they may be taken. While undergoing quarantine their feet should be dressed daily with chloralum, or a solution of carbolic acid, and by these means the risk of disease will be materially lessened.

There is one point more to which we must allude before concluding our remarks. It is evident that Ireland has got the disease from England, and if we are desirous to keep the nursery of home bred stock clean, we must begin at home. The only way in which this can be done with effect, will be to exclude all store beasts from foreign countries. Let the foreigner send as many fat animals as he can, but compel him to keep his lean beasts until he has made them fat for the butcher.

The Dairy and Poultry-Yard.

A PEEP AT NANT.

A LADY'S VIEW OF A LADY'S DAIRY AND SURROUNDINGS.

NANT is a lovely little gem of a Dairy farm belonging to Lady Bulkeley, the wife of Sir R. Bulkeley, Bart., of Baron Hill, near Beaumaris, and as it is kindly thrown open to the public on the same days in the week as the grounds and park surrounding the family mansion are, I availed myself of the opportunity of taking a party of friends to see the fairy-like flower garden attached to this retreat, on Saturday last. I have rarely seen a small piece of ground so well arranged—the taste evinced is perfect, the perfection of artistic colouring fully carried out in a minute scale. And never have I observed the contrasting hues of Calceolarias, and perilla, lobelia, and brilliant geraniums, so effective as at Nant.

I observed but one error, and that was in allowing some of the variegated and zonal leaved pelargoniums to bloom. As they are cultivated for the sake of their ornamental foliage, all flower stalks ought to be cut off.

I was especially pleased to see our native ferns so well placed.

"A man is never a prophet in his own country," and the same rule kept good with some plants; but here, in the heart of North Wales, in the garden of British ferns, they are duly honoured. Some fine specimens of the variety *Crispum*, hart's tongue, and holly fern, were most auspicious for their luxuriant growth, and were not inferior, in my humble opinion, to their moss race, foreign relation, which stood under the pretty verandah, in company with her Ladyship's birds.

The dahlia, tropacolums, fuchsias, gladioli, and other autumn flowers, admirably grouped, all added to the brilliant effect produced on entering the garden, an effect rendered more striking by the evergreen, rather sombre character of the walk leading up to the dairy house—a walk sheltered on one side by overhanging rock, in the crevices of which arbutus laurels and rhododendrons had been so thickly planted that they nearly hid the old time-stained grey stone from view. The dairy was exquisitely neat, cool, and nice, and the milk *was* milk. I certainly expected to see more of a farm and less of a plaything dairy; nevertheless, it was like all else, in *good* taste, and perhaps more in keeping with Nant and its fairy-like gardens, than a substantial dairy, with its large black marble slab for the butter, and slate milk-pans, each capable of holding the milking of seven good cows, like my own in South Wales would have been. There were two exceedingly pretty round tables, Italian workmanship, I believe, in the Nant dairy.

Lady Bulkeley has fitted up two rooms charmingly, as dining and drawing rooms, for she generally drives out every afternoon from the family mansion, to inspect her floral retreat. The grounds at Nant are always closed at two o'clock.

Autumn and winter winds will soon rifle the flower-beds of their beauty, and we shall ask in vain—

> "Where are the flowers, the fair young flowers,
> That lately sprung and stood,
> In brighter light and softer hues—
> A beauteous sisterhood?"

Therefore I would fain record my visit to Nant,

> "'Ere in the northern gale,
> The summer tresses of the trees are gone."

—Helen E. Watney, Ben Wyford, North Wales.

TRAINING COWS TO MILKING.

:ORRESPONDENT writes as follows to the *Lewiston Journal* on this im- t subject :—

domestic animals require some sort of g or education. The steer may require training than the heifer, because the re varied to which he has to become omed to make his labour "skilled" actical. While the cow may not need schooled in these higher branches of al studies, she should be taught that nd quietly while being milked, and ɔist" the right foot and place it back other, are virtues to be commended warded (by kindness, at least). No s should ever be allowed to pass their inter without being thoroughly "halter " so they can be led by the horn, or rope around the neck, gently and ıbly. Doing this when they are young, sily handled, it saves a vast amount of uent hard work and perplexity, and, , the animals many kicks and blows. while young, should be the motto of n-yard.

teach *all* your animals to love than fear you. Teach them to wel- our coming by presents of a nubbin of n apple, a little salt, &c., on all occa- hen practicable. Handle them freely, t them accustomed to your touch by g and scratching them. Cows thus ɔmed to being handled will soon come ıingly like the operation of milking. had a cow that from having exceed- ɔre teats contracted the habit of run- way from me, when milked in the ɔefore the milk was half down. All leavours to break up the habit failed, ı last resort, when she started away e, I caught up the pail with one hand and seized one hind leg with the other, and held on firmly. After hopping a few steps, and some pretty severe kicks and jerks to free herself were made all to no purpose, she "accepted the situation," and calmly submitted to the process till milked clean. Two or three such lessons cured her entirely. Such usage would probably have frightened her, and made the habit worse had she been unaccustomed to being petted and handled. But a few lessons gave her an understanding of what was required, and subsequently any attempt of a repetition of the misdemeanour would be suddenly checked by merely placing my hand gently upon her leg.

Leaving milk in the cow's udder has a most deleterious effect upon the cow. Undoubtedly many cases of garget might be traced to this neglect. And the habit, if persisted in any length of time, will cause a gradual falling off in the milk, and the cow will be very unlikely to regain her full milking powers again. This matter is worth more than a casual thought. Cows, the first year of their coming into the dairy, should be entrusted to no inexperienced or careless milker. A good milker will draw the milk in silence and quickly. Never allow yourself to leave a cow half milked, and then return and finish, thinking to get the full complement that the cow would give. This habit is nearly as bad as the one spoken of above, and its practice brings about the same results. By such means, cows often contract the habit of withholding their milk —a most perplexing habit, and often not easily cured. A good milker will attend to his work, and draw the milk clean, as quickly as possible, and establish the habit of giving down freely—a valuable item in a young cow.

PEPPER FOR POULTRY.

SOME keepers say that cayenne pepper should be mixed with the food of fowls to promote laying, while others assert that it is too artificial a stimulant, and keeps the bird in as bad a condition as medicine-fed persons are. Let us inquire whether it is as unnatural as might at first appear. Wild gallinaceous birds of all species season their diet plentifully with pungent aromatic herbs and buds. The fine flavour of the partridge's flesh is owing to its highly spiced forest fare, such as winter-green and checkerberries. So with other kinds of game. Domesticated birds have lost their peculiar game flavour, because their diet is comparatively flat and insipid, though nutritious. Audubon, studying the habits of the wild turkey, tells how the mother-bird plucks the buds of the spice-bush and gives them to her young, We have for a number of years given pepper, or something of the kind, mixed in small quantities with the soft food of chickens and grown fowls, summer and winter, believing that it makes the diet not unnatural, but more natural; and that health, as well as laying, is promoted by it. African cayenne is the cheapest condiment; but ground mustard and ginger may be occasionally substituted, for variety, and part of the time no seasoning should be used. Boiling water should be turned upon pepper before using, so as to make it less concentrated, the pepper tea, sediment and all, being stirred into the meal, a heaping tea-spoonful of the dry pepper to a peck. A little salt should be added. To be sure, it is said that salt is poisonc because they are sometimes killed a great deal of it. But a consider tity of salt exists in the bones of a It is agreed that it promotes the cattle, sheep, and swine; and for is proved to be especially nece pigeons, a tribe living on very sin to that needed by fowls. But we w it sparingly, salting the dough rather most persons do their own food.

Charcoal is sometimes eaten by f great avidity. It should always be them, pounded to the size of kernels for the varying needs of animals di appetite, and therefore what they c be good for them. As all birds principally upon the ground swall earth with their food, it probably gestion; and some recommend chicken dough should be thrown ground. If upon a fresh spot of e have no objection; but filthy, tair cannot improve it. There is a con dition expressed in the saying, "H do well unless they can get at the and we know that cattle, after bein all winter, sometimes eat fresh earth and a sod is given each fattening ca for the improvement of his appetite the ground is frozen, it is our custo a trifle of clean loam or subsoil to feed of fowls. They will pick c earthy matter from a pile of coal *Hearth and Home.*

The Country Gentlewoman.

THE PARLOUR GARDENER.

CHAPTER VIII.

Exposure of the Balconies.—The Balcony to the North—Irish Ivy, Hepaticas, Digitalis (Foxglove), Mimulus (Monkey Flower), Hypericum (St John's-wort), Nemophila, Violets, Periwinkles.—The Balcony to the East—Cobæa, Spanish Beans, Volubilis—Suspended Flower Vases—Disposition of the Flowers upon the Balcony to the East—Lilacs, Gillyflowers, Pinks, Pansies, Mignonette.—The Balcony to the West—Pelargoniums and Chrysanthemums.—The Balcony to the South—Sowing Seeds—Precautions against the Sun.

EXPOSURE OF BALCONIES.

THE title of this work imposes on me the obligation of first saying something to you of all that it is possible to do in horticulture without leaving your house. I hope I have shewed you, ladies, that to satisfy your enlightened taste for beautiful ornamental plants, and to occupy a part of your leisure time very agreeably, nothing more is necessary than gardening in a parlour. But this in no way prevents your giving also some of your attention to the only out-door garden which is possible to the greater portion of the inhabitants of large populous cities—the garden at the window.

Before anything else, you must consider the exposure of your windows; for the question is no longer how to cultivate living plants in the artificial atmosphere of an inhabited chamber, or a portable greenhouse. The garden plants at the window are destined to live in the open air, if, indeed, the gaseous fluid of cities, which is alone at their disposal, merits the name of air. The greater part of the time, however, they do not *live* there: reared in real gardens by real gardeners, bought in full flower to shine for some days only, they make haste to die in a medium that is not really air, and where, consequently, one cannot exact of them to live. Your windows are either exposed to the north, to the east, the west, or the south; or their exposure is intermediary between these four points.

THE BALCONY TO THE NORTH.

A balcony with a full northern exposure, particularly if it looks out on a street of only moderate width, and is situated too low down to escape from the emanations below, is in a position presenting the worst conditions as regards horticulture. Does this mean that we need not attempt gardening there? Far from it. It means only that the choice of plants with which it is possible to adorn our garden, is very limited; for all have need, more or less, of contact with the rays of the sun.

First, you must surround the balustrade and the framework of the window with a decoration of Ivy, which will give you a perpetual verdure. There are several varieties, the best of which is the Irish Ivy; its growth more rapid, and its green less sombre, than the common sort. If you take care to curtail such shoots as grow too long, and to pull off such leaves as turn from green to yellow, the Irish Ivy will surround your window to the north with a drapery of ever-verdant vegetation, which will serve to bring out advantageously the few flowers that it is possible to cultivate in this exposure. The Hepaticas, blue and rose-coloured; the Lily of the Valley; the Digitalis (Fox-glove), violet and white; the Mimulus (monkey flower); the large flowered Hypericum (St John's-wort); and the charming Nemophyla, are all plants which, as they grow naturally by the side of great forests, may consequently do without the sun. These, with the Violet and the

Periwinkle for their modest companions, will be the principal elements of decoration for your garden at the window with a northern exposure.

If, regardless of expense, you be fully determined to have on this balcony all the plants of the season, then procure and place them there, despite of the short duration of flowers in this exposure. You will do this knowing beforehand that the plants will die some time after flowering—an annoying result, which, however, cannot be avoided; it forms part of the cost which must be paid for the pleasure of having them there.

THE BALCONY TO THE EAST.

On a balcony to the east—if the street be a tolerably wide one, and the balcony belong to a storey high enough to receive a ration of air, if not very pure, at least supportable—gardening can be practised on a grand scale.

The window may be surrounded with climbing Cobœa scandens, instead of Ivy. This is a plant of very elegant foliage, although its flowers have but little brilliancy. You can give to it for companions Spanish Beans and Volubilis. These two would not have flowered at all to the north; nor will they flower to the east either, as they would do to the west or the south. Their flowers, nevertheless, will, by their lively tints, make an agreeable variety of colours in the decoration of your window with the eastern exposure.

SUSPENDED FLOWER VASES.

Giving to this decoration the graceful form of an arch, by means of a simple hoop nailed to the two frames of the window, you must join with it the accessory ornament of an earthenware vase of elegant form, in which to place a common flower-pot containing ornamental plants; some with straight stalks—such as Petunias or red-flowered Geraniums; others with hanging stems—such as Chinese Saxifrage, the runners of which, like those of the Strawberry, bloom at each joint while floating freely in the air. Similar vases are appropriate ornaments for the windows of all other exposures except the northern. During the cold season, they can be taken in, and hung to the ceiling like chandeliers; and it is easy to procure such as will perform the office of veritable chandeliers, being set round with sockets for holding endles, choice plants—Agaves, for instance—occupying the centre, whilst hanging plants, pouring over, as it were, through the spaces between the candles, depend from the rim of the vase.

DISPOSITION OF THE FLOWERS ON THE BALCONY TO THE EAST.

On the eastern balcony, besides the plants before pointed out for the northern exposure, a great variety of common plants—which are not the less agreeable for being common—may succeed each other all the year round. That you may not deprive yourself of the use of the balcony, in case of your liking occasionally to stand there, you must take care to place such shrubs as Roses and Persian Lilacs at the two ends; next to them, such herbaceous plants as are somewhat tall—Gillyflowers or Pinks, for instance; then the rest in the middle. The very low ones—Pansies, Auriculas, or Mignonette—should be in a shallow zinc vessel, such as is used for flower stands. Thus, when at your window, you feel as if surrounded by all the perfumery of your toilet; and you will not be deprived of the use of your balcony, when it pleases you to go out upon it to breathe there the best air that the city affords at this season—that is, a compound consisting of a little air and a great deal of dust. As you would not wish to quarrel with your neighbours, nor your landlord, nor the police, you must take care to keep under the pots and boxes ornamenting your balconies, vessels of varnished earthenware, sufficiently deep to hold the overflowings of the waterings; you will thereby avoid staining the front of the house, and giving to passers-by a sort of shower bath which may not be to their taste. During prolonged droughts, the foliage of the plants of your garden at the window may probably change from green to grey—thanks to a thick coat of dust; in which case, you must, at least once a-week,

ese plants taken, one by one, to the your kitchen, and there, by means of ing pot with a rose pierced with very oles, give them, one after the other, washing, such as they receive from a ong shower of rain.

he flowers of the season—from the of March to the Chrysanthemum of ber—may succeed one another on the exposed to the east. Perhaps the ope (which requires a great deal of d the Lantanas, and some others, exceptions; those will, at any rate, er to the west and south.

THE BALCONY TO THE WEST.

he western exposure, you have *carte* —every ornamental plant may pass m season there. You can place there, whole summer, Myrtles, Camellias, s, and Azaleas, which belong in winter arden in the house. Two sorts of plants, greeable—the Pelargoniums and the nthemums—can be easily propagated by cuttings struck in the way I ready shewn you. Nor is there any a portable greenhouse this time; you rike them simply in pots filled with arth, taking care to place over your or the first eight or ten days, a tumbler upside down, pressing down the edge into the earth. After the slips have remove the tumblers, and water the plant once or twice a-week with a good f dish-water that you have had put or this purpose by the cook; you will h what vigour they put out. I shall is occasion to give you some advice ll be useful to you, on the manner of g the Pelargoniums and Chrysan- ns that you have propagated by slips.

IOD OF TRAINING THE PELARGONIUM BY SLIPS.

ip of Pelargonium left to itself shoots rd right and left, puts forth a quantity ge and flowers badly; this is what the gardeners, adopting a term applied lly to colts, call *badly broken*. When it well rooted, and beginning to shoot vigorously, pinch off the top. The two or three shoots next below this will develop in side branches of nearly equal strength; destroy all that put out below these, retaining them alone to form a regular head. If one of these branches runs up, and is impatient to pass the others, do not hesitate to pinch it off. Below this point two shoots must be left at first—one of them to be taken off at the end of eight or ten days. Thus will equality in the vegetation of the Pelargonium be maintained. These attentions will be a true pleasure to you; you will witness their effect immediately; and the flowering of your Pelargoniums thus managed will be as equal and as perfect as is natural to the different species of this beautiful genus.

TRAINING CHRYSANTHEMUM SLIPS.

Chrysanthemums propagated by slips should be treated in the same manner, according to the same principles. If you belonged, ladies, to the good society of Pekin, instead of to that of our country, the following is the way you would treat your Chrysanthemums:—After having planted such one of your slips in a deep and slender vase, you would direct your care to the development of the terminal shoots; as shoots made their appearence, they would be pitilessly destroyed. The Chrysanthemum thus treated, will gain a great deal in height, and will end by forming at its summit a single tuft of flowers, of which flowers one only must be allowed to remain; this one will arrive at a most extraordinary degree of development. It is thus that the wives of the mandarins cultivate the Chrysanthemum—the flower of their special predilection. Every year, in the great cities of the Celestial Empire, there are exhibitions specially for Chrysanthemums, where everybody sends their flowers, and where prizes are decreed for the tallest plants; not as to the most beautiful flowers, but to the most beautiful flower, each plant having but one.

To every country its custom, the proverb says. To ourselves, "outside barbarians" as we are, the Chrysanthemum, cultivated in the Chinese fashion, appears, and with reason,

completely devoid of grace. You will take care, then, by means of the same pinching process practised upon the Pelargoniums, to compel your Chrysanthemums to form a head consisting of three or four branches of equal strength, well furnished with flowers, making the plant of such a height from the ground as may be suited to the disposable place on your balcony, and leaving to each branch the number of flowers which it sees fit to have.

THE BALCONY TO THE SOUTH.

It is upon the balcony exposed to the south, ladies, that you can practise the most varied horticulture—a balcony to the south being the border of a parterre on a reduced scale. There, in pots filled with an equal mixture of earth and manure, you may produce, by sowing, all the annual ornamental plants—Pansies, China-Asters, Balsams, French and African Marigolds, Petunias, and Coreopsis; and to these sowings you will be indebted for this part of the decoration of all your balconies and of your flower-stand. For, upon a balcony with a southern exposure, may be made to grow, from the seed, plants, not only for yourself, but for all your friends and acquaintances besides.

PRECAUTIONS AGAINST THE SUN.

In their natural situation, the roots of plants, plunged into the soil, receive only a heat tempered by the coolness imparted to them by the soil beneath. In pots, on the contrary, the extremities of these roots, which line the inside of the pot, and which are the most tender part of them, are literally burnt when the sun shines on its external surface. You must not think that repeated waterings will remedy this; if you water the plants often, the roots in pots exposed to the sun, being then in contact with hot water, will be boiled instead of being roasted, which will come exactly to the same thing so far as their life is concerned. It is then indispensable to have a plank inside of the balustrade of your balcony facing the south, which plank, its edge touching the floor, must reach as high as the top of the largest pots. The outside of the pots being shaded by this plank, the roots of the plants will experience only a moderate degree of heat; for any excess of this may then be prevented by frequent waterings. Plants in pots also require an additional protection from the sun—the shade of a tree, or an awning, or something of the sort.

THE

COUNTRY GENTLEMAN'S MAGAZINE

DECEMBER 1871

THE TRANSFER OF LAND.

AT the sitting of the Municipal Law Section of the Social Science Association, the subject for discussion was, "What alterations are expedient in the Laws relating to the Devolution and Transfer of Land?" We give the papers read, and the discussion which took place on the subject.

Mr MOZLEY read a paper by Mr William Sykes Ward, Leeds, on "Suggestions for Facilitating the Transfer of Land." He assumed it was generally considered desirable to diminish the expense and to make the title to any estate as safe, and to enable it to be as easily transferred as the title to stock and shares in public securities or railways, so far as such purpose could be effected without any injustice to public or private rights. He referred to the expense in investigating the title of land on every transfer. With some slight or comparatively feeble and abortive exceptions, little had been done by the Legislature to amend the laws regulating the title to land, and this appeared to have arisen from the popular prejudice laying the blame on the terms of the conveyance instead of on the anomalies of the law and the practice of investigations for such titles. He referred to the law of contracts, which had grown to be a great evil, from a series of decisions of the Courts, and had become a very great anomaly. All other documents meant what appeared to be the construction of them in precise and grammatical English; but the contract for the sale of land meant a great deal which was not expressed, and which could never be understood by a non-professional person signing it; and until the law of contracts for the sale of land was altered by statute, no other amendments in conveyancing would be fully operative. No injustice could arise from a contract being required to be affirmative instead of negative; a vendor must agree what title he had to give, and not to stipulate what he was not required to give. He recommended that the statute constituting the Register of Deeds for the West Riding of the County of York should be extended to all counties. The system of registration established in the county of York was, with the exception of some details which might be amended, very simple and inexpensive, and perfectly answered the purpose of preventing the suppression of deeds; yet the necessity of searching the register, and the cost of registering all deeds, caused a very considerable increase in the cost of conveyances and mortgages of small parcels of land, so much so that there was some reason to doubt whether registration should not be confined to deeds of settlement and incumbrances not effecting a change of apparent possession.

Mr ARTHUR HOBHOUSE, Q.C., also read a paper. Adverting to the magnitude of the subject, he warned the audience that he did not intend to discuss the larger questions raised by the Tenure Reform Association and the Land Labour League, who were aiming rather at a

reconstruction of the whole basis of society than at the reform of any particular department of law. He first dealt with the transfer of land, meaning thereby the machinery by which it passes from hand to hand. He traced briefly the history of legislation; the Commission of 1857; Lord Cairns' Bill of 1859; Lord Westbury's Act of 1862; the Commission of 1869; and Lord Hatherley's Bill of 1870. He imputed the ineffectiveness of the Act of 1862 to its too stringent and comprehensive character, and submitted that the Commissioners of 1857 and those of 1869 were right in recommending a registry confined to absolute ownership and not requiring perfect titles in the first instance. This, he thought, would work usefully. The speaker then went on to state that it was impossible to combine any simple system of conveyancing with a very complex system of law, and that by far the most important part of the subject was the devolution of land on the mode and extent of ownership. He laid down the principle that land should always be in hands capable of fulfilling the duties required by the community at large. It was so in feudal times for military purposes; it should be so now for commercial and peaceful purposes. He then shewed that, owing to settlements and to personal disabilities of owners, a very large portion of the land of the country was fettered by restrictions. The remedies he proposed were—1. That the land of a deceased owner pass to his executor; 2. That in the hands of the executor it should be treated as personal property now is; 3. That the disability of beneficial owners should not fetter dealings with land, but that his trustees, being the registered owners, should have full power over it; 4. That nobody should be permitted to settle land except on persons in existence at the date of the settlement; 5. That the period for bringing an action for the recovery of land should be shortened. In conclusion, he warned his hearers of the great difficulty in effecting alterations of this kind, especially that contained under the fourth head; even that contained under the second head, simple and obvious as it was, had been urged for years with great ability, but with no hope of success until this year.

The PRESIDENT (Mr W. Vernon Harcourt, M.P.) said that he had prepared a few observations on the same subject, and they pointed to almost the same conclusion as Mr Hobhouse had come to. It was not likely, he said, that the ideas which were subverting continental society would find support in this country; but there was seldom smoke without a fire. The law relating to land in this country was in a profoundly unsatisfactory condition; and the time had come when something must be done. It was the business of the law to define the rights of property, but it was first necessary that they should understand what those rights were. Of all property there was none in which the nation at large were more deeply concerned than that which consisted in land. There were those who wished to see the State assume the administration of the land; but he could not concur in that. He believed the State was extremely ill-fitted to perform either the public or private functions of the landowner. It would be best to leave the land in the hands of private proprietors, who should be able to buy what they wanted, and to sell when they wished. They could not, without creating more evils than they cured, attempt to make men improve their property as they ought. They should remove all those artificial obstructions which at present the law permitted to freedom in dealing with the land, and it was in that sense that the Legislature might beneficially act by removing the fetters which stayed the action of landowners. The real remedy was to be sought, not in a system of registration, but in the simplification of titles themselves. The nominal proprietor of an estate was often only the mere recipient of the rent derived from the land, and the nominal proprietor was perhaps in the receipt of barely sufficient to meet the wants of his family, and not being able to get the capital necessary to improve the land, the estate languished and the population pined. It was said by some that the present system was necessary to keep up old

. If old families were worth keeping
r would keep themselves up; and if
re not, then it would not be the advan-
the community that the law should
our to keep them up. The amend-
f the law, he thought, should come
e landed interest, who should demand
freedom from the shackles imposed
iem by the law of settlement.

Serjeant Cox read a paper, entitled,
Law Reform." Two parties, he said,
manding a reform of the laws that
e real property—one party seeking
the other seeking revolution. The
of the paper was to consider what
; are required, and in what manner
ay be accomplished. The substance
complaint is that land is monopolized
w, though many are desirous to possess
ling to purchase it—being prevented
1 the inability of the owners to sell, by
of the law of inheritance, of settle-
of incumbrances, and the consequent
f transfer. The alleged causes of the
1 monopoly of real property are :—
ety of tenures; 2, The law of inheri-
3, The powers of devise and settle-
4, Mortgages; and 5, The system
nveyancing. Taking these alleged
seriatim, the learned Serjeant sugges-
1, that facilities should be afforded
conversion of any tenure into free-
by extending the powers of the
old Commissioners; and that all
g varieties of tenure should be
d to three—viz., the owner in fee,
vner for life, and the tenant for a
f years not exceeding one hundred.
: abolition of the law of primogeniture,
; to owners of property who desire to
/e the estate in the family to do so by
3. The powers of settlement and de-
)rm the most formidable obstacles to
dy sale and cheap conveyance of real
ty, as purchasers are reluctant to buy
ty subject to such charges. He pro-
to apply as a remedy the practice
d with respect to land required by
/s—viz., to permit of its being dis-
d, at any time, by any person entitled to the actual possession, from all incumbrances whatsoever, on application to the Copyhold Commissioners. 4. With respect to mortgages, he would abolish the existing system of requiring a reconveyance when a mortgage is paid off, and make a simple endorsement of a receipt upon the mortgage deed to operate as a reconveyance of the estate. 5. As to the costs of conveyancing, these are almost entirely due to the difficulties caused by the preceding defects in the law of real property. So long as the law allows a man to have any interest in real property other than actual possession, there must be an investigation into title preliminary to sale. The proposed power of discharge of mortgage would do much to remedy the evil complained of; but that which most of all would abbreviate the labour and cost of title-making, would be a compulsory register of incumbrances of all kinds; and no charge upon property should be valid unless registered. In conclusion, he approved of Lord Derby's suggestion of a new Doomsday Book.

Mr MOZLEY (for Professor JACOB WALEY) read the fourth paper, entitled, "Suggestions for Facilitating the Transfer and Disposition of Land." He did not depreciate the advantages of a system of State registration of owners and transfer of land; but the officers charged with the carrying out of the Land Transfer Act of 1862 should be invested with much larger powers. He did not think the Continental system of sale and purchase of land would suit this country. It appeared more than probable that any change in the Land laws not involving the complete reconstruction of our social system, would not have the effect of materially diffusing the ownership of land. Still, increase dfacilities for the transfer and disposal of land might be introduced with advantage. He proposed—1, That five years should be the limit (and not twenty years as at present) for the assertion of dormant or displaced claims; 2, That adverse possession should operate against the estate—that is to say, not merely against the limited owner during the currency of whose interest the adverse

possession takes place, but against the whole series of owners having successive interests, who, for this purpose, shall be considered as represented by the owner entitled to the possession barred by the non-assertion of his rights; 3, In order to protect the purchaser against concealed incumbrances, the law should require as a condition of the settlement of land against a subsequent purchaser, and this settlement should be enrolled in the Common Pleas; 4, Estates tail should exist only for purposes of defining and limiting the devolution of the land so long as not disposed of by the act of the tenant in tail; 5, The personal representative of a deceased owner of land should have power to sell or mortgage the real estate of the deceased, and receive the money; 6, A limited owner in possession should have power to lease or sell the estate for any purpose for which it is best adapted, by an application to the Court of Chancery, which shall appoint trustees to receive the money, and hold it in trust corresponding to the interests in the land.

VIRGINIA AS A FIELD FOR EMIGRATION.

THE following letter, received from an Englishman settled at Gordonsville, Virginia, which appeared in the *Times*, may be interesting to intending emigrants :—A year's experience of Virginia enables me to give you what is not only a truthful, but I think, useful account of the country. We purchased, as you know, a farm of 200 acres in the Piedmont region, at 18 dol. (a little over £3) per acre, and we have already harvested fair crops of wheat and oats from fields which were covered last September with bushes and overgrowth and undergrowth of every description. We now have standing Indian corn, high enough in some fields to conceal a man on horseback; a small but promising crop of tobacco, and 3 or 4 acres of good potatoes. If we have a fair season from this time we shall not make less than from 8 to 10 cents, after deducting labour, which has been four or five times as expensive as it will be in future, because the cost of fencing, grubbing and cleaning up generally will not again recur. This process of cleansing new land is not so formidable as I expected, and is easily performed with a simple implement worked by oxen, called a "new ground coulter." There are a vast number of farms to be had here, ranging in price from 3 dol. to 100 dol. per acre, which are not woodland, but as beautiful and home-like as in England, and these, of course, do not need the same preparation. Here and there, too, peeps out from the foliage a fine old Virginian homestead, surrounded by orchards of apples and peaches, by beautiful vineyards and meadows well stocked with cattle and sheep. I find the Virginians, who are frequently descended from old English families, as civilized and well-informed as at home. The society is agreeable, and, moreover, hospitable to a fault, especially to Englishmen. I am told there is less crime here than in any other State. There is hardly an instance of a farm being for sale that cannot be secured by a payment of one-half or one-third of the purchase money, and sometimes less, the remainder being payable in from two to five years, with interest at 6 per cent. With industry, it is easily possible to make a farm pay for itself as the payments fall due. Fortunes have been made in the western States in this way; for in a few years, farms that have been improved realize also improved prices.

The annual rainfall in Virginia is between 30 and 40 inches, and the climate corresponds with that of France or Southern Germany. The productions, therefore, are those of the above named countries. Wine, Indian corn, cotton, tobacco, pea-nuts, brown corn, sweet potatoes, and water-melons are produced in addition to the usual staple productions. An

rious farmer may reasonably expect to
t from 6 to 10 bushels of corn (5 bushels
barrel) per acre, 10 to 25 bushels of
1 to 3 tons of hay, 100 to 300 bushels
atoes. On fair land the average yield
acco is 1000 lb. per acre, worth from
l. to 100 dol. per 100 lb. There are
productions which yield large returns—
ıpples, pears, grapes, peaches, beef,
butter, and cheese. With good farm-
; understood in England, these figures
be largely increased; stable and farm-
nanure is hardly used at all. You can
ood cows at from £5 to £10, the
price including the calf. As the prices
ter, milk, and cheese are as high, and
imes higher, than in England, and there
rge demand in the vicinity of the large
it is clear that there is a good opening
airy farmers with a capital of, say,
).

the important question of labour, I will
ıy that it is good, but that the negroes
: careful watching. There need be no
lty with them, and their power of work
derful. I may add that we have with
the men who began with us. The
l rate of wages throughout the State is
l. per month, with board and lodging,
cents and board, or 75 cents and no
by the day. The board consists of
eck of Indian meal, ½ lb. of
ɔer week, and a log cabin to sleep in.
n, who are often excellent field hands,
t at 25 cents per day and board. You
·e hands by the year at from 60 dol.
› dol. You give 5 dol. to 10 dol.
:ook, and from 2 dol. to 5 dol. for a
ıaid. The price of corn (Indian) is
at 90 cents to 1 dol.; wheat, 1 dol.
ts to 2 dol. per bushel; oats, from
ts. to 75 cents.; hay, 20 dol. per ton
› lb.; butter, from 25 cents to 75 cents,
ing to time of year. Fresh meat
:s from 12½ cents to 16 cents; bacon,
5 cents to 16 cents per lb. Stock
is especially to be recommended. The
:s are covered with the nutritious
blue grass, and are watered with
nt springs. Cattle can feed the whole
year round, and are free from the dangers from Indians and wild beasts, to which stock is exposed in the far west. Here we are, too, in close proximity to great cities and the best markets. Many of the farms now to be sold have the right of grazing cattle over large tracts of natural pastures. A farmer in this valley can drive his cattle a short distance over the Blue Ridge Mountains into the valley beyond, and have them pastured at the rate of 25 cents per head per month.

In 1855, the Patent Office of the United States reported that the cost of a three-year-old steer was 25 dol. in New York, 24 dol. in Ohio, 15 dol. in Illinois, 12 dols. in Iowa, and 8 dol. in Virginia. Similar advantages would be met with here by the sheep farmer. This valley is 300 miles long, and from 10 to 30 wide. It is watered by the Shenandoah and other streams, and enjoys natural drainage. Being based on limestone rock, it has a fertile soil and excellent climate. The land here commands higher prices than in other parts, but deservedly so.

I will now briefly answer the question which will naturally arise in the minds of all who have read glowing accounts of Virginia as a field for emigration. Why is it that these rich lands and lovely houses can be bought at such prices? Before the war the capital of the Virginian planters consisted almost entirely of slaves. Some owned as many as 100, worth from 1000 dol. to 2000 dol. each. By the abolition of slavery, men who had been large capitalists have become so poor that they have not now the means to work their lands. They therefore desire to realize them for what they can get. Under the new state of things the South is destined to advance in prosperity, and those who are wise in investing capital there now will reap a rich harvest. Soon the chances for the man with a few hundreds will grow less, and land will rise beyond his reach, as is the case in the Western States. Mr G. C. Walker, the Governor of the State, to whom I had an introduction from Chief-Justice Chase, of the United States, is very enthusiastic about the future of Virginia, and assured me he desired English emigration.

FREEDOM OF CULTIVATION

By Mr A. S. RUSTON.*

PERHAPS there is no document extant which is regarded with so much real conservative veneration, and whose text has been so literally adhered to as the old skeleton lease, which has been so scrupulously preserved and so jealously cared for in nearly every lawyer's office, and has been handed down as a kind of heir-loom from generation to generation. Its formulæ and its covenants have been repeated with the most verbatim exactness, decade after decade. It is a curious old document, hoary with age, and revered for its antiquity. Its style of composition drives one's thoughts back to the times of agricultural infancy, and its verbosity is a painfully wearying infliction. It contemplates no agricultural progression, its covenants of to-day are to be the settled, unalterable obligations of the future, as they have been the sure and binding terms of the past. There is an utter absence of the conception that science and practical agriculture can ever successfully combine in largely augmenting the capabilities of production, but there seems the implied idea that agriculture has reached its zenith, and that the cultivators of the soil must be held in with bit and bridle, lest unrestrained liberty should result in exhaustion, and landlord and tenant sink in one common ruin. Now we want to look at this subject for a few minutes, just to see how far these restrictions are wise, and how far they may be advantageously relaxed. It is not our intention to discuss the merits and demerits of leases, or the advantages or disadvantages of yearly tenancies, with sufficient and satisfactory tenant-rights. My object is rather to plead for greater liberty in cultivation, whether the hiring be for a term of years, or only from year to year. We want to break the spell and charm of those old stereotyped covenants and conditions. They have long enough, as relics of antiquity, held in captivity minds otherwise strong and enterprising, and have placed hindrances innumerable in the way of agricultural progress and advancement. Let us blot from our minds all memories of the past, and starting *de novo*, and taking an intelligent and thoughtful view of the present, and the probabilities of the future, seek to shape our farm agreements according thereunto. We shall then be conferring a boon alike upon owners and occupiers, and upon the country at large.

THE REMOVAL OF OBNOXIOUS COVENANTS.

With a population daily increasing, it appears of the utmost importance that every possible effort should be made to increase production in order to meet the enlarged requirements of the community. The acreage under cultivation cannot be largely increased, and the yield per acre, in many instances, cannot be very considerably altered. It has been said that the man who makes two blades of grass grow where only one grew before, is to be looked upon as a public benefactor. And so he is. And we may, regarding this as the enunciation of a principle, claim a rich mead of praise for the man who, by the judicious application of capital, and the skilful management of his farm, if not doubles, does yet largely increase its produce. We don't wish to say hard things of those who place impediments in the way of the successful accomplishment of so desirable a result. We rather wish to invite their attention to the evils consequent upon the restrictions imposed, and to ask their co-operation in seeking their modification or removal. There is, doubtless, a growing conviction of the necessity of relaxing

* Paper read before the Wisbech Chamber of Agriculture.

ne extent the stringency of existing .nts, and of giving more freedom cope to enterprising and intelligent ers; hence, we now and then see a ı of covenant amongst the better class ants disregarded, and allowed to pass ıt remonstrance, or, in familiar phrase, :ed at." We would, however, prefer the obnoxious covenants removed, their breach unheeded. It is neither n principle, nor sound in morals, to laws, and not enforce obedience to

The last quarter of a century has fruitful of such mighty changes, and rapid agricultural development (very the slow development of the jelly-fish monkey, and the monkey to the man) ll the relations between landlord and t require revision, and claim serious and diate attention. Steam cultivation, the ıous consumption of artificial food, and lmost incredible quantities of artificial res supplied every year to the soil, ne- ate fresh rotations of crops, and alto- r altered modes of husbandry, and call ew forms of agreement, as between s and occupiers of land. This seems so self-evident a fact, as to be patent to one, and to require no argument to :e it.

CAN FARMERS PRODUCE MORE MEAT?

we have already intimated, the yield per ɔf the cereal crops grown upon a farm, ı is highly and adequately cultivated, ɔt be very considerably increased. dy the state of cultivation is such, that ffort to produce larger crops, will, in rable seasons, be fraught with evil, and in loss. The increase will be in the of straw, but with this there will be a sponding decrease in the yield of grain. ıeed only remind you of the harvest of in proof of the correctness of this asser-

One of the greatest fears experienced e modern farmer who cultivates his land y, is that the first thunder shower in will prostrate his luxuriant crops, and ısly reduce their money value. And all because he uses too much cake, and is too generous in his application of manures. What, then, must be done? What is the remedy for this state of things? Is his style of cultivation to be lowered that he may with greater prospect of profit to himself manage his farm in harmony with those stringent and unaltered covenants under which he occupies? Or shall those covenants be relaxed, and the privilege of taking additional and varying crops be conceded, encouraging a more free and extended, instead of a diminished and restricted use of all those fertilizers which enrich the soil, and when applied with judgment, under right and favourable circumstances, benefit alike the owner, the occupier, and the consumer? We say, encourage high farming, give greater freedom of cultivation, and let the land everywhere teem with plenty. Make more meat, meat is dear, animals must pay for feeding, are all utterances with which our ears are quite familiar. But the practical question is, how can more meat be made? And if made, what will be the result? To make more meat, implies the use of more oil-cake and other feeding agents, and the extensive use of these implies greatly enriched manure, and this manure to be a source of profit to the farmer, implies an increased acreage of money-paying cropping, which in its turn implies the removal of restrictions and increased liberty of cultivation. Surely it has not come to this, that agriculture must quietly fold her arms—do as Lord Russell said a few years ago it was our privilege as a nation to do, "rest, and be thankful." Shall the rolling tide of agricultural progress be stayed and dammed back, because antiquated covenants and deep-rooted prejudices render its onward flow unprofitable? Which shall yield—shall progress, or shall the restraints of progress? Shall intelligence or prejudice triumph? These are questions which thoughtful men are presenting, and are shrewdly observing what are the signs of the times, that they may try to puzzle out what the answers shall be. There was a time when the idea of additional cropping was the occasion of the gravest apprehensions; and the possible, yea, the probable exhaustion of the soils was a bugbear which terrified

many. But these fears are gradually subsiding, and we should rejoice to pronounce their funeral oration; but they are not dead, only dying: every now and then we detect signs of life. But science is making rapid strides, and day by day disclosing the futility and groundlessness of such fears, and in companionship with practice (an alliance at one time deemed incompatible) is teaching us how possible it is to increase production, and yet to retain the fertility of the soil. I need only refer to the experiments which are being made year by year by Mr Lawes, at Rothamstead, as an evidence of the truthfulness of this. Probably some of you may have seen these, and others may have read or heard of them; but be this as it may, they clearly indicate what may be done, and shew the decided advantage of high cultivation, conducted under the guidance of practical and scientific knowledge, and how surely it results in profit to the occupier, without loss to the owner. Many land-agents and landowners are intelligently and thoughtfully weighing these matters, and are preparing to encourage and facilitate progress. We commend the subject to the attention of all.

BY THE EXTENSION OF PRIVILEGES THE OWNER AS WELL AS THE TENANT PROFITS.

To say there are no difficulties in the way of a liberal extension of privileges is to assert what is not true, and to say that these difficulties are insurmountable, is, we conceive, not the less untrue. Were all tenants good farmers, and fed their lands bountifully, and cultivated them wisely and well, the great hindrance to increased liberty would be removed. But so long as estates are encumbered with slovenly and grasping tenants, who, regardless of consequences, are ever seeking to take from, and ever unwilling to add to the soil, allowing their cupidity and avarice to control all their operations, vainly imagining that such a system is to their advantage, and deluding themselves with the notion that in proportion as they impoverish the soil they enrich themselves; we say that so long as this state of things continues, so long will there be an argument to be employed in opposing concessions so urgently needed. But the argument, however skilfully it may be used, is not a sound one. It cannot be wise to punish the good, and discourage all progress, and set aside all advancement, and crush all spirit of enterprise, on the ground that some are unworthy. We entertain far too high an opinion of the intelligence and ability of those who occupy a position between the owner and the occupier—a position so honourable and responsible — as to suppose that they cannot devise some way of encouraging good tenants and high cultivation, and of repressing and restraining the evil practices of bad ones. It is not for us to assert dogmatically how and in what way this shall be accomplished. Suffice it to say, we believe in its practicability and are deeply impressed with its necessity. To put the matter briefly, our position is this. It is of the utmost national importance that the land should be made to produce all that the discoveries of modern science, and the most skilful practical cultivation can possibly make it yield, and that everything that prevents the realization of this should be at once and for ever removed; that by liberal management greatly increased produce may be secured without any corresponding exhaustion of the soil; that increased production consequent upon high cultivation implies better rents to the owner, larger profits to the occupier, cheaper food to the consumer, and increased wealth to the nation; that the main obstacle to the enjoyment of this universal good is the system on which lands are let, and the restrictions which are imposed. We therefore, in conclusion, plead for a full and intelligent re-consideration of the terms on which land is let, and their adaptation to the exigencies of the present time.

PRIZE FARMS IN NORTH WALES.

R THOMAS RIGBY, the Inspector of Farms appointed by the Denbigh- and Flintshire Agricultural Society, has the following interesting particulars in :port regarding the holdings of the suc- l competitor :—

mium 8, class 2 (for occupiers of farms 150 acres), to Mr Alexander Roxburgh, daria, Llanrwst. This farm is 345 acres ent, 191 of which are in pasture, 65 oats, nips, 32 rape and seeds, 1 potatoes, 1 old wurtzel, 5 orchard, garden, occupa- oads, &c. It is purely a hill farm, and wholly for grazing and feeding. Its aries, but it is chiefly light and peaty, lying on rock and part on a clay sub- The course of cropping pursued is first second turnip, third oats again, and and seeds to follow. The usual stock ts of 4 farm horses, 2 colts, 2 cows, 30 bullocks, 20 heifers, 200 breeding (Shropshires), 200 feeding sheep, and ambs. All the hay, straw, turnips, and e part of the oat crop, is consumed on emises. Most of the liquid manure is d, and bones, nitrate of soda, and lime plied with a liberal hand. Claimant ccupied the farm eleven years under Sandbach, Esq., Hafodunos, under a tenancy. The excellence of the man- nt of this farm consists in its adapta- o the situation and climate, and to ill and energy with which it is con- l. Its exposed situation is much modi- y plantations of fir trees, which yield r and improve its appearance, and the are divided by rail and wire fences proportionate sizes. Most of it is d, and the outfalls, ditches, and water s are in good keeping. The oat crops not heavy, nor were the turnips very r on half the field of 50 acres, wire- and slugs having destroyed the plants; e land was very clean and in good heart. The clovers and seeds were excellent, and the 32 acres which had rape growing with the clover was being grazed by 200 feeding sheep, that were evidently doing well on the admixture. The pastures were sweet and clean, and all the premises, farm- yard, garden, house, and outbuildings were in proper condition.—Inspected Sept. 16.

Mr Roxburgh had one opponent, whose farm, situate in the Vale of Clwyd, is under skilful and enterprising management. All the green crops were very clean and very good, as were the pastures and meadows. Corn stubbles were a little deficient in places. Fences in good keeping, but too much crowded with trees, many of which can never become either very valuable or ornamental. Your inspector regrets to see so many small fields and so much timber in the hedge-rows in many parts of the Principality, and thinks that a little intelligent reflection would lead to a free use of the axe. Trees and hedges impoverish the soil for yards near them, their shadow retards the growth and ripening of crops, they are a harbour for vermin, and they limit the eco- nomy of improved implements to cultivation. Much improvement has evidently been made on this farm, but it is capable of a more and somewhat better arrangement of fields, and with a continuance of the same co-operation by landlord and tenant as has existed hitherto, it must soon attain to the rank of a prize farm of superior merit.

The Society's medal to owners for this class of farm is well deserved by Captain Hughes, of Ystrad, near Denbigh. His farm contains 340 acres—63 of which are in pasture, 43 seeds grazed, and 15 mowed, 70 wheat, 62 oats, 11 barley, 22 vetches, rape, ryegrass and kohl rabi; 2 potatoes, 36 turnips, 6 mangold wurtzel, and about 10 orchard and garden, occupation roads, cottages, &c. The customary rotation of cropping is, 1st oats, 2d wheat, 3d turnips, 4th wheat or oats, and then

seeds. Stock consists of 9 farm horses, about 60 horned cattle, 200 breeding Shropshire ewes, and 25 pigs. All the hay, straw, and turnips are consumed on the farm. The liquid manure is ran into the midden-stead, and a large quantity of lime, artificial manures, and linseed cake is purchased annually. 160 acres of the farm have been drained 4 feet deep at 10 yards apart, and is working well. A long length of useless fences has been eradicated, reducing the number of enclosures from 51 to 13, and a quantity of young quicks have been planted where requisite to improve the farm. The green crops were all first class and very clean; clover and seeds excellent; but the corn stubbles were rather foul, caused probably by deeper ploughing than previously. The bottom soil on this farm, as on many others, produces annual weeds in abundance when turned up to the sun, and the fact should be remembered and provided against whenever the plough is sent deeper than before, by sowing in such width of drills as will allow a free use of the hoe, the subsoil being an open gravel; the pastures were not full, and no doubt suffer much in hot weather, and require judicious stocking to graze profitably, and it was easy to understand that. Their produce had been much limited the last three years by the prevalent drought. The farm-yard and buildings shewed the constant supervision of a master's eye, and the arrangements for chopping and preparing food for stock by steam are most complete. The stackyard is well filled, stacks well made and neatly thatched, and the whole occupation is a worthy example of enterprising and profitable farming, and a credit to Captain Hughes's own management.—Inspected Sept. 19.

Premium 9, class 2 (for occupiers of farms of less than 150 acres, three claimants), to Mr George Byford, Bodyngharad. This farm contains nearly 146 acres, and is situate at a considerable elevation, near the town of Ruthin, from which it is approached by good roads. 52 acres are in pasture, 21 clover and seeds (mowed), 25 wheat, 13 oats, 15 barley, 2 vetches, 12 turnips, 1 potatoes, and about 5 in orchard and garden, homestead, plantation, &c. Usual course of cropping is first oats, second wheat, third turnips, and fourth wheat or barley seeded down. Stock kept is 4 farm horses, 3 dairy cows, 80 sheep, 100 lambs, and 7 pigs. All the hay, straw, and turnips are consumed on the premises, and all the liquid manure made available. Two tons of artificial manure applied annually to turnip crop, and about 25 acres per year have been covered with marl and salt. The land lies contiguous to the house, and its aspect is favourable for the course of farming pursued. The corn crops had left full stubbles free from bad weeds. Clover and seeds all good, and the pastures clean and full of sweet herbage. Much improvement had been made in the fences, and in reclaiming land and re-arranging garden, house, and farm buildings. Gates, roads, and farm-yard are in good order, and the whole has a look of efficient management rarely seen in young men after only a four years' term of occupation.—Inspected, September 18.

The other claimants in this class are good farmers. One had a full stack yard, capital clovers, and fair pasture; but part of his root crop was weedy, and one or two other points not up to the right mark. The other has a well arranged farm, good fences, and some first-class grazing for sheep, but deficient corn crops, and but few turnips.

The silver medal to owners in this class is claimed by P. B. D. Cooke, Esq., Pen y garth, and is due to him for substantial improvements made on a rough farm of inferior soil. It contains 104 acres, 19 of which are in pasture, 16 clover and seeds mown, 20 meadow, 5 oats, 25 barley, 2 vetches, 14 turnips, 2 mangold wurtzel, and 1 orchard garden, homestead, &c. The stock consists chiefly of sheep, 3 farm horses (2 of them breeding mares of good stamp), and 2 colts equally promising. All the produce of hay, straw, and turnips is consumed on the premises. The whole of the liquid manure is made available, and about £60 per annum has been expended in bones and artificial manures. A low-lying meadow of about 16 acres has been reclaimed from a perfect morass by efficient drainage, and the whole

ındergone a renovation by eradication le and useless fences, and by more r sub-division of fields. The corn crops ear have been a full average, and the ıs are healthy and growing. Much has ıtly been done, and well done, under ıuperintendence of Mr Cooke's agent Γ. W. Bowdage), but there is still much effected before the utmost capacity of production is attained.—Inspected mber 19.

ːmium 10 (to occupiers of not less than ːres and under 80 acres), Mr Hugh ıes, Hendy, Mold. Claimant's farm is actly situated near his house, and con- 52 acres, 33 of which are in pasture, 2 r and seeds, 4 barley, 5 wheat, 3 oats, 2 ɔes, 2 turnips, and 1 mangold wurtzel. ıtock consists of 2 horses, 2 cows, and 200 sheep and lambs. About £15 of town manure, and £8 worth of ıial manure is used annually. The crops have evidently been very good, ːe the turnips and mangolds, and per- clean. The pasture land shews rich herbage, but in a 17-acre field that ıin long in grass there is more than ɡh of thistles of a character which seem determined to live and grow despite frequent applications of the scythe. Mr Hughes thinks they owe their life and increase to constant pasturing with a full flock of sheep for many years. How this can be is not very clear, and in the absence of proof we should ever be careful of making charges, lest they prove false. Certain it is, many fields that are never stocked with sheep, grow equally as good thistles as Mr Hughes's, and are just as much a plague to their owners as his are to him. "Grow your thistles in a thick crop of seeds or hay," says Mr Mechi; "it will reduce their vigour, and they will grow slender and spiral, and when cut in this state they are more likely to die after the operation than when they have plenty of space and sunshine all round them in which to develop their strength and beauty," and there is sound reason in the argument. A frequent variation of mowing and pasturing would tend to destroy coarse grasses, and in due course beget a more equitably grazed surface in grass fields than is usually seen now. The house, garden, farm buildings, and stackyard, at Hendy, are in neat keeping, and its tenant is quite deserving of the prize.—Inspected Sept 19.

ʼEAM CULTIVATION AND THE CONVEYANCE OF POWER.

WRITER in the *Aberdeen Journal* supplies us with his ideas respecting onveyance of force in steam ploughing. ays, the best method of conveying the r from the steam engine to the point ıich it has to be exerted for the purpose uling a 3, 6, or 8-furrow plough, is by s "of a light hempen rope of ¾ of an in diameter," and then he proceeds to ːin, that this rope is quite incompetent ː task of drawing the implement to and ong the field, if attached directly; in an attempt to draw a 3 or 8-furrow ɡh through the soil by direct hauling ıl necessarily result in snapping the rope on the first strain put upon it. For the immediate traction of the implement from headland to headland, wire rope must be had recourse to. But there is this all important difference in the way, he says, in which the two ropes, the hemp and the steel-wire—perform their parts in the operation: a given point of the one moves over space at the rate of 30 miles per hour, and any given point of the other at the rate of only 3 miles per hour.

The writer then proceeds to explain how a hempen rope can be made to convey for ½ a mile, the power necessary to draw a 6-furrow plough through the ground. He says:—

If we were to say that the force or power which is capable of moving a mass of matter at double velocity, is capable of moving twice that mass of matter at a single rate of velocity, that might not, perhaps, be readily apprehended; but every one has seen a man raising a stone by means of a bar of iron used as a lever, and must have observed that the point of the lever to which the man's hand was applied, moved through a much greater space than the point of the lever on which the stone rested; or, let us say that the stone was raised 1 inch, and that the man's hand went down 10 inches, then, in that case, the power gained would have been as ten to one; or a power of weight, say, of 50 lb. would have balanced a weight of 500 lb. It thus appears that in the employment of this mechanical power, or indeed, of any of the mechanical powers, or any combination of them (a machine), what we gain in force, we lose in space, and, *vice versa*, what we gain in space (or speed) we lose in force. This is of universal application. Well, now let us suppose 6-furrow plough in the ground, and that a piece of steel-wire rope is attached to it; let the wire rope be brought to the headland, and attached there to the end of a lever 11 feet in length; let a peg be driven into the ground, or otherwise sufficiently secured to serve as a fulcrum against which the lever is to be wrought, not in a vertical, but in a *horizontal* direction; let the lever be now placed against this fulcrum, at a distance of 1 foot from the extremity to which the wire rope is attached; let a small rope of, say, ½ inch diameter be attached to the long end of the lever, and let this rope be pulled in the proper direction (the lever being kept in position) with a force equal to 2 cwt., then the plough is drawn forward with a force equal to ten times 2 cwt., or 1 ton; and, if the "draught" of the implement be equal to 18 cwt. (3 cwt. to each plough), it must move forward; albeit the space through which it can be moved by our apparatus is very limited indeed; and instead of moving in a direct line, it will move in a circle, that is, unless we suppose the short end of the lever to be armed with a segment of a circle (1 foot in diameter), round which the rope might pass. In order to move the plough forward 1 foot, the extremity of the lever to which we have supposed the small rope to be attached, must move over 10 feet.

Two facts are thus exemplified:—First, and mainly, that, by the intervention of this simple "mechanical power"—the lever—a very small and light rope may convey power or energy equal to a weight of 1 ton, and quite equal, therefore, to the accomplishment of the task which we have assigned to it. (In so far, indeed, as the rope is concerned, it would bear a much greater strain than that which we have assumed, for, according to common calculation, a hempen rope of ½ inch circumference, or little more than ⅓ inch diameter, will bear a strain of 1000 lb.; but, of course, a rope cannot in practice be strained up to, or even very near, its point of fracture.) And, second, it is shewn that what we lose in space (that is, in speed) we gain in power.

Let us substitute for our lever a wheel and axle of the same relative dimensions, or call them two drums, mounted on the same axle, the one drum 10 feet in diameter, the other 1 foot; and let the axle be placed in a vertical position, and mounted in a framework, sufficiently secured in position by anchors, or otherwise. Let the wire-rope from the plough be coiled round the smaller drum (placed lowermost on the axle), and the small hemp-rope round the larger drum. Then by pulling the small rope, and thereby making the drums to revolve, the power gained will be the same as we gained before by the use of the lever; that is, if the small rope be pulled with a force of 2 cwt., a force equal to 1 ton will be exerted through the wire-rope upon the plough. But while the end of the small rope is drawn forward a distance of 10 feet, the plough will move forward only 1 foot. In order now to shew how the important element of *time* comes into consideration, let us suppose a horse to be "yolked" to the end of the small hempen rope in order to draw it forward, which, on the conditions assumed, he could easily do; that is, he could draw the 6-furrow

ı. Let him move forward at his ry pace of 3 miles an hour, the plough ıove forward at the rate of one-tenth f 3 miles in an hour. But we want the h to advance at ten times that rate, or rate of 30 miles an hour. To make the h advance at that rate, the horse must forward at the rate of 30 miles an hour. e performance of such a task, he is of e quite incompetent; but the steam- e is quite competent to perform it. We only to pass the light hempen rope l a groove in the fly-wheel, and (the l being 5 feet in diameter) to set the e in motion at the moderate rate of 166 ıtions per minute, and the thing re- l is done. It is not necessary, be it ved, that the rope be coiled up at the e; by splicing its ends together it is to work as a common belt, except that perhaps necessary to pass it once en- round the drum in order to give it ent working hold. As every point in eriphery of the fly-wheel moves through at the rate of 30 miles an hour, every in the endless rope moves through space lless round—so long as the fly-wheel ıues to supply the requisite energy—at ıme rate. The periphery of the larger is, of course, carried along with the at an equal velocity; but every point in rcumference of the smaller drum moves gh space at the rate of only 3 miles per hour consequently, the wire-rope coiling round ves, and brings the plough forward at ıme rate. With respect to the amount wer or energy which the respective ropes v within the hour, that amount is the

The nature of their respective actions t this: one moves slowly along bearing ght of ı ton; the other runs backwards orwards ten times within the hour, and s 2 cwt. to each time. It is obvious that ıempen rope must be kept "taut," as s say, or in a sufficient state of tension ve the necessary working adhesion. That rfectly accomplished simply by the in- ntion of an adjustable pulley.

the point where the power is to be ed or expended for the performance of work, the rate of motion or speed may be reduced—or increased, if requisite—to any given rate that may suit our purpose, whatever that may be—the traction of a plough, or the turning of the drum of a thrashing machine.

In the actual practice of steam ploughing upon the system now under consideration, a machine called a "Windlass," takes the place of our supposed two drums, or wheel and axle; but the nature of its action is precisely the same—speed is reduced and power accumulated. But the machine so called is made to do much more than this. It is provided with stopping and reversing gear. The person in attendance upon it can, by means of clutches, &c., stop the plough in an instant; he can reverse its motion, and make it uncoil the wire rope as the plough is drawn away from it by the windlass on the opposite headland; or, with more certain command over it than the common ploughman has over his horses, he can make it draw cautiously when the implement is in stony ground, or when he anticipates—or has signalled to him by the man on the plough—the probable occurrence of any other obstruction; and all this is done, be it observed, while the light rope is running on at its steady rate—that is, it is done without interfering with the motion of the engine, which, as we have said, may be ¼ mile off, or not even within sight of the person at the windlass. Nor is this all that can be accomplished by this ingeniously contrived piece of machinery. As soon as it has finished its task of drawing the implement towards itself, the turning of a clutch handle makes it (by the aid of an anchor stationed a-head) begin to creep slowly along the headland into position for commencing its labour again, at a given signal.

It will be seen that any sort of steam-engine, locomotive or portable (or even fixed, for that matter), may be used to afford the necessary power. All that is requisite is to have a grooved rim put upon, or attached to, the fly-wheel; or a grooved wheel may be provided, to be slipped upon the crank-axle, alongside of the common fly-wheel.

FACTS ABOUT STEAM AND HORSE POWER.

By Mr J. J. Mechi.

SAID my engine-driver to me to-day (he was formerly my farm-labourer), "My eldest son is twenty-four years of age next November, and your engine was put up in December, twenty-four years ago." Well, there it is now, threshing away, and likely to do so for many years to come. After twenty years' use of the original boiler, I changed it away for an 8-horse new Cornish boiler paying the difference. The Cornish boiler is more powerful and economical than the old flue boiler. The engine is of 6-horse power. If agriculturists were to sit down quietly, and calculate without prejudice the relative cost and value of steam *versus* horses, the former would get the favourable verdict. The annexed figures, extracted from my farm account-books will give unmistakeable evidence on this subject. We use our engine about two days out of three throughout the year. From October 1 to June 1 it is at work almost daily, according to our number of live stock. It is often worked long hours or overtime, when required. The facts justify the following conclusions:—That a steam-horse costs less to purchase than a real horse; that it will last more than twice as long; that its annual cost for food (coal) is less than half that of the real horse; that its cost for attendance is only one-third the cost of a real horse; that it will do twice as much work as a real horse; when my 6-horse fixed steam-engine rests, it only costs me 4s. per week, or the interest on £200, the amount of its cost and fixing; when my six horses rest, they cost me £3, 18s. per week for their food, besides manual attendance and interest on their cost; a horse works eight hours and rests sixteen; a steam-engine requires no rest except for cleaning or repairing; a steam-engine gets no lameness from kicks or strains, no death or inflammation from gripes, wind, or flatulence, or the other numerous complaints and disasters that befall horses.

Manual attendance per horse per annum...	£16	10	0
Ditto per steam-power	6	10	0
Annual food per horse per annum	35	0	0
Ditto per steam-horse (we burn dust coal)	10	0	0
First cost of horse.....	35	0	0
Ditto of steam-horse	34	0	0
Annual wear and tear of horse.....	3	0	0
Ditto of steam-horse	1	12	0

EXTRACT FROM THE ACCOUNT BOOKS.

	Cash Paid.		Cash Received.	
	Engine-driver.	Coals for Engine.	Grinding for hire.	Grinding for our own stock and horses.
1866...	£25	£31	£30	£16
1867...	25	35	32	26
1868...	25	44	39	24
1869...	25	36	32	18
1870...	25	41	63	26
	£125	£187	£198	£110

The engine-driver's time is averaged. He receives 2s. 6d. a-day. The other items are exact receipts and payments. In addition to the grinding, the engine cuts all the hay and straw chaff, breaks cake, pulps roots; works the sack-raising tackle, the grinding-stone, linseed crusher, thrashing and driving machine, irrigator pumps; so that deducting the receipts for grinding, all this is done for nothing, except the wear and tear, and repairs of engine. Cost of corn, hay, and bran for my seven farm horses:—

EXTRACT FROM THE ACCOUNT BOOKS.

This is independent of the ryegrass, mangold, tares, and clover, consumed green, and straw chaff.

1866	£158
1867	199
1868	232
1869	187
1870	201
Grinding corn	53
Cutting chaff for horses	50
£31 per horse per annum	£1080
Three ploughmen for five years, at £33, 6s. 8d.	500
Two horses to each ploughman	£1580

: deduction should be made from the for horsemen's attendance, because ɔour during the harvest, and at other /hen the horses rest. My engine and :ost £170 without fixing. Horses are stabled when not at work. They work very hard. All their food is given in the manger; straw and hay cut fine, corn ground, mangold pulped, rock salt in the manger. Stable ventilated.

ENGLISH PARKS AND PLANTATIONS.

GLISH parks and plantations, with a few exceptions, are seldom to be ith as they ought to be, either for :e or profit. A nobleman, of agricul- :elebrity, made a painful admission years ago, when he said, "Very few proprietors in this country know how to manage their own estates, or :hey are mismanaged for them."

ɔ is accountable for this state of things? ot to be feared that, should our Rev. ɔtors of Oxford and Cambridge be put balance, they would be found wanting? lay last week, I had an hour to spare ford, and on going into the Botanic n to see what progress had been made I last saw it (now several years ago), grieved to find that not a single step :en taken to keep pace with the times, hstanding the great number of fine which have been introduced into this y during the last thirty years, many :m not only of the greatest value for ıenting and improving our park scenery, ı a commercial point of view. What ıe the cause of this? A continental ı once gave us a hard hit when he "It is well for the rest of the world ou English are such a drunken people; .t not so, you would soon be masters of hole world." Our engineers have de- rated to us that timber, *versus* stone iron, must be had for our railway rs. That being the case, who can but oor John Bull, looking on his helpless en, not yet taught to supply their y's wants, but must again and again empty his pockets to mend his roads by foreign workmen, simply because the schoolmen have been asleep, whilst his own dear boys have been allowed to grow up in helpless ignorance. Better schoolmasters must be had, and that at once.

Let John have an open competition and offer handsome prizes, for the best men of any country or colour, and he will soon fill his professors' chairs with workmen of the right stamp. Our young lords and squires, with their assistants, will then take the lead, and no longer lag behind.

We want our agricultural, arboricultural, horticultural, and mechanical professors, each to be furnished with the best specimens and appliances in their several departments which can now be obtained, to enable them to demonstrate, both theoretically and practically, the best and surest way to secure what every right-minded man desires, viz., the social progress and well-being of his brethren at home and abroad.

The drift of the foregoing observations will be more intelligible to the generality of readers by giving a practical example under each of the departments already named.

AGRICULTURE.

Let us take a hundred of the most intelligent landlords and tenant-farmers to be met with in any market town in England, into the nearest meadow. Let us put to them separately the following practical questions:—1. How many species of plants are in this field possessing feeding and nutritive properties? 2. How many are positive weeds? 3. How

many of them are poisonous, and instinctively rejected by horses, cattle, and sheep? Can you give the comparative merits of each of the true pasture plants, as settled by Sir Humphrey Davy fifty years ago? 4. Name the best kind of pasture for the richest and best butter. I simply ask what per-centage of our liberally educated gentlemen (and I am willing to allow ten of the best schoolmen of our principal Universities to be included in the one hundred), I ask how many out of the hundred would be able to give intelligent answers to the four queries? Oh! Give me a rich butter-cup meadow for the best milk and butter, has been nearly the answer in almost every county in England where I have put the question, to both farmers and their wives. It is too ridiculous to think that we are holding our Royal and provincial Agricultural Society's meetings annually, drinking each other's health; making our after-dinner speeches; complimenting each other on our splendid achievements; and boasting of our having stolen a march on our compeers; and yet all the while ignorant ourselves that the finest pasture lands in England are producing a large per-centage of nothing better than useless weeds—and our rich buttercups, as we call them, are virulent poisons, and unknown as such to their worthy masters. Ranunculus acris and R. bulbosus abound in our finest meadow land; both species are acrid poisons, and neither horses, cattle, nor sheep will eat them, until compelled to do so, when made into hay.

ARBORICULTURE.

Here we are in a sad plight, to say but little of our mismanaged and neglected plantations, many of them filled with trees or stunted bushes of little or no value. Instead of improving our breed by always making a judicious selection of the finest trees of the respective species, we have been employing old men and boys to collect our seeds from the most worthless trees, of easy access, at the cheapest rate possible; and thus, instead of progressing with intelligence, we have, with a few exceptions, been retrograding, and filling our plantations with trash scarcely worth growing. A worthy Baronet, with whom I had the honour to spend an evening a few weeks ago, told me that during the last six years he had felled over £30,000 worth of timber, and had realized from £110 to £150 per acre from land not worth more than £45 to £50 per acre. Thus we have, in from sixty to seventy years, timber bringing in worth three times the fee simple of the land on which it grew. How many can tell such a tale, and why not?

HORTICULTURE.

Our Royal Horticultural Society, though liberally supported by public patronage, has been see-sawing like a door upon its hinges, for the last twenty years, without making an inch forward in the right direction. Twenty or thirty stove or greenhouse plants, very beautiful in themselves, and admirably cultivated, but of no commercial value beyond flowering shrubs to be looked at, and only to be enjoyed by a few possessing glasshouses and a professional gardener. Twenty such plants have always carried off the highest prize offered by the Royal Horticultural Society. Trees and shrubs of national importance have been altogether ignored until 1868, only three years ago, when, from pressure from without, the executive were urged to offer prizes for the best trees and shrubs. Last year, at Oxford, about £70 were offered as prizes for a few stove and greenhouse plants, and only £6 were offered as the first prize for trees and shrubs, including conifers. The result of this mis-management was, that not a plant of the kind was shewn, and the kind people of Oxford were eased of their money, and allowed to remain in blissful ignorance; and this year, at Nottingham, over £150 were awarded for first-class prizes for stove and greenhouse plants alone, and only £32 for first class-prizes for all kinds of hardy trees and shrubs. Who can deny that a better school is required in this department?

MECHANICAL OR ENGINEERING DEPARTMENT.

Take, for example, draining, admitted by all to be indispensable for ultimate success.

s this managed? Many believe that nake drains so deep, and so far apart, ıry so many tiles or drain pipes, that d is drained, without ever taking into ɛration that water has a decided objec- › run up-hill. Many thousands of ; are annually squandered away—aye, en upon the Government stereotyped . of drainage, for want of a dash of being put into the drains. Here, also, schoolmaster is wanted.

ɛding of stock and improving our of fine trees might be noticed and ɛnted on, but time and space forbid. words on each must suffice.

STOCK.

whole bovine tribe, whether they be ıeys, Ayrshires, Angus, Guernseys, ›rds, or Shorthorns, possess, although ʒ in a surprising degree in animals same breed, three distinct properties, he beef, and butter, and the cheese ʼ. Here I can speak practically, ; now in my small meadow the daugh- a pure-bred pedigree shorthorn, with I never failed to take a prize when as shewn, and likewise her calves. ɔow was a magnificent creature, beef er, and during the top of the season ven as much as 8 gallons of milk in ʼ-four hours, and produced 16 lb. of ɛnt butter per week. A pure-bred sey fell into my hands after the death ɛ former master. This extraordinary l had sixteen male calves in thirteen and never had twins. She gave over . of butter per week. These animals were produced simply by an intelligent, persevering selection of both dam and sire, possessing in themselves the qualities desired, and which were obtained, issuing in a reward worth persevering for.

Trees now crowding our fine English parks, many of them a disgrace to the locality in which they may be found, ought to give place to much finer things, now abounding in our best nurseries. Thus the landscape would not only be incalculably improved, but timber of great value, and trees of surpassing beauty, would replace many only fit for the fagot pile. Here, again, the schoolmaster is abroad.

Trees can be shewn in the Midland Counties raised twenty-five years ago from seeds taken from the same tree, the same season, not more now than a few feet high, growing side by side with others of magnificent growth, the heights varying from 40 to 45 feet and upwards. This disparity arose (and was quite apparent the first season, by presenting an unmistakeable constitutional debility) from certain conditions not being fulfilled, in accordance with physical laws well known to students conversant with physiology. The same laws govern both the animal and vegetable economy; hence the necessity for a knowledge of the Great Creator's works.

Just in proportion as we study and know His laws, moral and physical, honour Him by obeying them, we invariably secure for ourselves and others never-failing great and happy results; but if we either ignorantly of wilfully violate Divine rule, we must expect and shall meet with disappointment now and hereafter. W. B.

Agricultural Engineering.

POOLEY'S AUTOMATIC GRAIN SCALES.

IN the weighing of grain there has been more time and money spent than in performing the same operation in connexion with any other trade with which we are acquainted.

That the millions of quarters of grain used from hand to hand, one is apt to think it something surprising that until lately no attempt has been made to invent and bring into general use mechanical weighing machines, requiring little attention to make the weight registered correct, and the whole work carried

Pooley's Automatic Grain Scales.

in this country year by year have been weighed by the use of the ordinary scale and beam, or other form of weighing machine, requiring a large amount of manual labour, is of itself something astonishing; but when we consider that this process is probably repeated half a score of times as the produce passes out at the smallest expenditure of manual labour.

Messrs Henry Pooley & Son, Liverpool and London, have, since 1867, when they exhibited and obtained a medal at the Exposition Universal in Paris, for their first Automatic Grain Scale, been carefully

ıg out experiments and making im-
nents on automatic weighing machines,
they successfully exhibited at the
hester and Oxford Shows of the Royal;
was not until this season, at Wolver-
ton, that they were able, publicly at least,
ıibit their perfected machine, of which
ve the pleasure to give an illustration.
e action of the machine will be easily
stood from the following explanation,
we quote from the *Brewers' Journal*, of
;th of September :—"This apparatus is
e principle of an equal beam, which
it a special recommendation, as it is
with ordinary standard weights of any
denomination. The grain, shewn lying on the cut section of the floor above the machine, is allowed to run through an orifice into a rocking spout, which directs the stream alternately into one or other of the two compartments into which the large vessel below is divided. The exact weight having been received into one compartment, the automatic arrangements come into operation instantaneously. The load is discharged into the receptacle provided for it; the supply is directed into the other compartment, and the load passed is registered. And thus the operation proceeds continuously, so long as anything remains to be weighed."

BENNETT'S SYSTEM OF STEAM CULTIVATION.

NCE the small beginning at Gillyburn,
where Mr Fisken first tried his plan of
cultivation, or rather, in that instance,
ation by water-power, an innumerable
ıer of systems have been introduced, in
cases only to disappear as they were
ght forward. We have now, however,
y in operation, at least two systems,
direct," and "roundabout," as they are
l; the former comprising the double
ıe, and also the single engine, with drum
lisc anchor, the latter the ordinary round-
t steel wire rope, and also the light rope
louble windlass, as used in Fisken's sys-
The success attending these, no doubt,
:es men of inventive genius to attempt
roduce what they consider improvements
hem, and among these we find a new
ant, Mr H. Ogilvie Bennett, of the firm
essrs Bennett & Kennedy of Edinburgh,
ıeers to the Scottish Steam Cultivation
pany (Limited), who has patented a
m which can neither be called "direct"
'roundabout," but a combination of both.
the help of engravings, and the follow-
explanation, for which we are indebted
ngineering, our readers will be able to
: of the value of Mr Bennett's invention.

"The system," says our contemporary, "when in operation, consists of a traction engine, or farm locomotive, which, by running along the side, or any convenient part of the field to be cultivated, or on an adjoining field or road, draws any description of implement from side to side of the field, by transmitting its motion through a rope passing round guide pulleys or anchors placed at convenient points to suit circumstances, some of such guide pulleys or anchors being self-shifting. The ground plan clearly shews the arrangement. The self-shifting guide pulleys or anchors, A A, are disposed so as to be moved along the headlands at intervals as the operation proceeds, the stationary guide pulleys, B, being placed so as to conduct the rope in the most convenient manner to and from the engine to the implements or carriage. The ploughing or other implements are drawn in the line across from one self-shifting pulley to the other, and the engine moves to and fro on the track or road, *t t*. The simple onward movement of the implement is obtained by the engine traversing over a distance corresponding to that traversed by the implement, but in a different direction. C is a self-shifting pulley, provided to regu-

late the length of rope by taking up slack or giving more length; this will only be necessary where the field is not rectangular.

"The advantages claimed by Mr Bennett, for this system are—The application of the best form of engine for road traction purposes, to cultivation, or the drawing of wheeled carriages or waggons across fields, so that a farmer requiring a traction engine may, with the best engine to be had for this work, cultivate his farm at favourable times. The engine can remove the anchors, &c., from field to field, and by travelling round the field leave them in their places ready for work, and can also draw the rope round the field. It is also urged that the system can be quickly set in operation, as the rope is merely fastened to both ends of the engine by clip links, which are easily attached or cast loose, while no windlass is required. It is considered that at most three men and two boys are sufficient; only one engineer, and he may be kept in constant employment with the engine; the other men and boys need only be agricultural labourers.

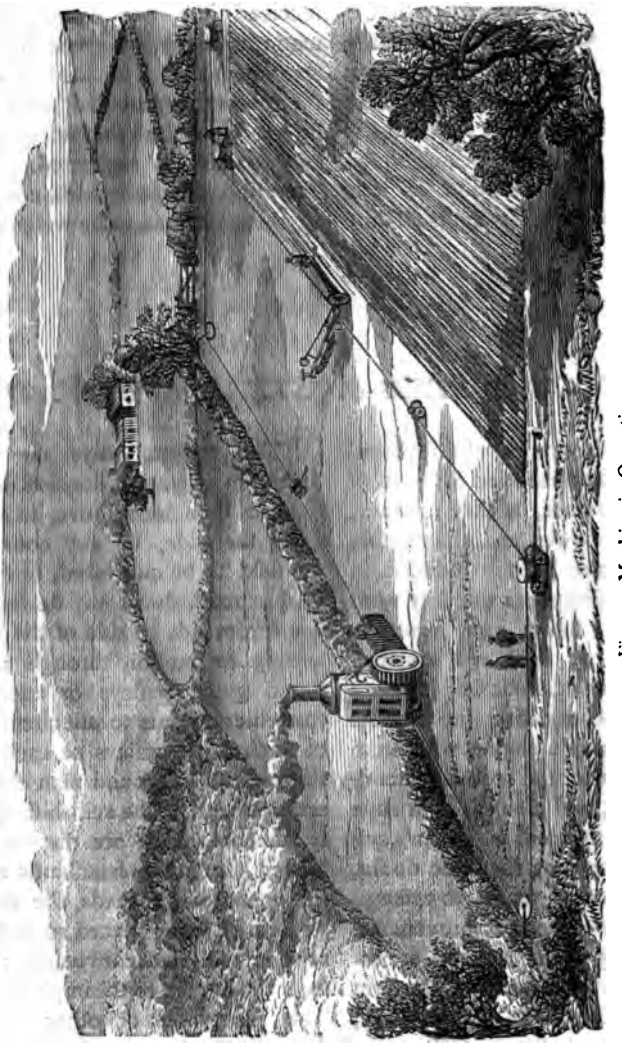


Fig. 1.—Machine in Operation.

"The engine, it will be noticed, does not

ver the ground to be cultivated, or that en cultivated, but, on the contrary, it to and fro over any convenient line und or road, while the implement or ;e is gradually working up the field. a road adjoins any side of the field, gine is run on this road, and not on the or stationary work, or if the track be covered with a layer of ashes, the work may be continued in wet weather. In many cases, hard roads adjoin fields, and these are, of course, used in preference to the headlands.

"In conclusion, we may state that Mr Bennett's system appears to be intended rather

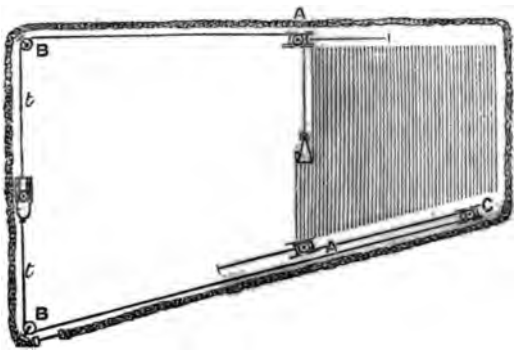


Fig. 2.—Ground Plan.

Mr Bennett considers that even where t first, the track on which the engine s is, after a few turns of the engine, hard, and is therefore less easily :d by rain. When this track is too wet e engine, the rope may at once be cast id the engine sent to perform traction as a plan for enabling traction engines in the possession of farmers to be turned to account for steam cultivating purposes, by a moderate outlay, than as a system which it is proposed to place in competition with ploughing tackle on the clip drum, double drum, or double-engine systems."

THE "ABERDEEN" MANURE DRILL.

the application of artificial manures to the soil, much loss has often occurred from efficient way in which the operation has carried out. One has only to examine articular district of the country to find om the appearance of the crops, that in e majority of the fields, that there has great irregularity in distribution, one n being over-manured, while another is almost its native state. Although this re apparent where manure has been d to grass land or cereal crops, it bears as regards root crops also. But alto- apart from the unequal distribution of anure by hand sowing, there is in its application to root crops a loss of time, and consequently increased expense, and to a greater extent, perhaps, than one could at first imagine. We refer more particularly to drill husbandry, and in cases where crops are grown entirely with artificial manures, which, in certain districts of the country, amount to fully one-half of the turnip crop. The present mode of proceedure entails three operations: first, the opening of the drills, then the sowing of the manures by hand (sometimes only one drill at a time), and lastly covering the manure with the plough. It has often occurred to us, that a machine might be made to perform, if not the whole,

at least the larger part of this labour in one operation; and we are now glad to find that when we were only thinking, a well known Galloway farmer, Mr John Ferguson, of Ardwell, was acting; and, from suggestions made by him, Messrs Benjamin Reid & Co., of Aberdeen, have patented and manufactured a machine, of which we give an illustration (fig. 1.)

Fig. 1.

The machine requires little explanation at our hands, but we may state that it is fitted with Sams's patent waved discs, which discharge the manure. The coulters are attached to levers, and rise and fall like those of a corn drill. They can be shifted from 27 to 29 inches to suit the different widths of drills. The quantity of manure distributed is accurately regulated by sliding plates, in a simple and efficient manner.

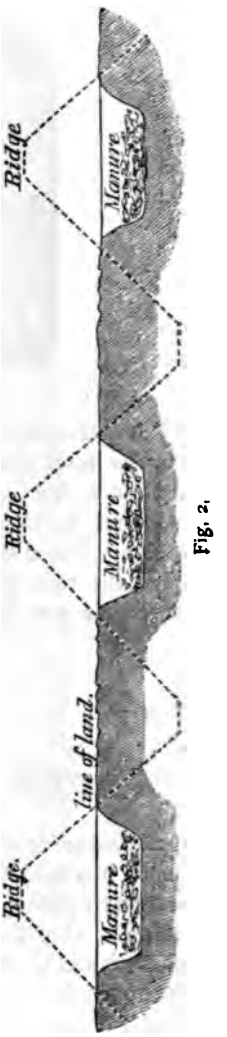


Fig. 2.

The woodcut (fig. 2) illustrates the method of working, which may be briefly described by our stating that the machine is drawn over the land and marks out, or rather opens up the drills, by making three shallow furrows, about 10 inches broad, into which the manure is deposited and spread. The ridg-

ng or double mould-board plough follows the machine, and throws the ridges over the manure, as shewn by the dotted lines, ready for the reception of the turnip seed.

Mr Ferguson states "that two men and two horses can drill and sow the manure over 9 Scotch acres (upwards of 11 imperial) per day of ten hours, including stoppages taking in manure. By the usual method, four men and four horses could scarcely do the same amount of work in the same time, so well or with the same ease." It may be added that the machine is sold at a price within the reach of most farmers.

The Farm.

LORD LEICESTER ON DEEP CULTIVATION IN NORFOLK.

AT the annual meeting of the Docking Union Agricultural Association, the object of which is the promotion and reward of faithful and skilled service and workmanship on the part of agricultural labourers, servants, and others employed in the Union, Lord Leicester, president, made the following remarks upon the important subject:—

I must congratulate you, gentlemen, upon meeting after your farming prospects have been so successful. You have grown good crops, and you have harvested them well. It has been a year that has been peculiarly favourable to the soils that we cultivate; in fact, the light land has at last had a turn. And I would ask you whether we have on this description of soil and in a favourable season grown all that it is possible to grow with profit? Whether we have attained the greatest possible return at the least possible cost? And whether our growing crop, the root crop, is all that could be desired? I fear, gentlemen, that those questions can hardly be answered in the affirmative, and as long as we are so cautious in deviating from the beaten track, and so slow in adopting the knowledge that is extending itself throughout the country, we shall be more dependent upon the seasons than we ought to be, and we shall not obtain that success for our efforts which we otherwise should do. Since I last met you, I have travelled much through England and through parts of Scotland, and taking into consideration the whole of the land that I have seen under cultivation, I think I may safely state that the produce of the land might be nearly doubled under a perfect system of agriculture. I have observed a want of capital and skill on the part of the occupier, and an apparent want of assistance, and an arrangement on the part of the owner. The buildings were bad and inconvenient, the fields too small and ill-arranged, and too often covered with useless timber. But the two greatest evils that, in my opinion, prevented the growth of larger crops, were inefficient drainage and shallow cultivation. The soils that we cultivate have a natural drainage, but I am now convinced that on the lightest of our Norfolk lands, deeper cultivation than we are in the habit of adopting would be remunerative. I have not had an opportunity yet of inspecting the root crops of my neighbours, but I fear that they are not altogether satisfactory. Now, I last year ploughed every acre for my root crop 12 inches deep by the aid of steam, and much of this land was, I am happy to say, lighter than that which is generally to be found on my estate; and I would ask those gentlemen who are sceptical as to deep cultivation for the root crop on such soils as ours, to examine my root crop and to judge for themselves. I do not assert that deep cultivation will secure the root crops in such drought, as we sometimes experience in this country; but it will have this effect, that the drought will not injure the roots on the deep ploughed land until two or three weeks after those on the shallower soil are destroyed; and in those two or three weeks rain may come, and the root may be saved. This was my experience last year; it has also been so this year. A doubt has been expressed as to the results of deep cultivation upon the succeeding corn crops. I do not entertain this doubt, because I believe that a heavy root crop is, on our soils, the best preparation for the succeeding corn crops, if a due proportion of that root crop is fed off on the ground. This, as far as my experience goes, has been the

I have lately thrashed some barley on hat was ploughed 12 inches deep for ot crop, to test an experiment that I ıade of sowing barley 12 inches from › drill; and as it is important, gentle- vhere figures are stated, to be accurate, with your permission, read the result t experiment. "The experiment was › pieces of land adjoining each other, :ontaining 1 acre 3 roods 28 poles. ıirds of the previous turnip crop fed h fat sheep, eating 1 lb. of linseed cake ıy." I ought to state that, with this ion, all my barley on the Park Farm ed 9 inches from drill to drill. "One drilled at 9 inches apart, with 2 bushels d per acre, produced, best corn, 20 ıs; best tail, 2 coombs; inferior tail, nbs; total, 25 coombs, or 13 coombs :re. One piece, drilled at 12 inches with 1½ bushels of seed per acre, :ed, best corn, 20 coombs; best tail, nbs 1 bushel; inferior tail, 2 coombs; 24 coombs 1 bushel, or 12 coombs els 1 peck per acre." The conclusion I ome to from that experiment is this, that ering that the head corn was the same ı cases, air and light are necessary to : all crops, and also that wider distances ss seed might be used than is generally stom; and I think that as 12½ qr. was ɔduce of 43 acres of land of 9 inches .rill to drill, the beneficial effect was the ɔf deep cultivation for the root crop. And also that after deep cultivation, clover to be kinder and more likely to stand t land which has a certain admixture of ɔsoil than where such an admixture has :en place. I do not recommend the 12 inches from drill to drill. I believe that is too wide on our description of soil, as the 6 or 7 inches is too narrow. On my Marsh Farm of strong land, I find I never sow nearer than 12 inches either for wheat or barley; and I find that 3 pecks of wheat and a little more than 3 pecks of barley is ample seeding. Before I sit down I will say one word to my brother landlords. I do not believe that agriculture will ever attract that capital, that skill, and that energy that is required to bring it to perfection until ample security is given in the form of a lease to the occupier of the farm, and from that lease many unnecessary restrictions which exist in ninety-nine leases out of a hundred are omitted. I found that in the lease in use on my estate there were many restrictions—such restrictions as I should not like to be bound were I a tenant of a farm. I have, therefore, with the assistance of my agent and my tenants, deviated from the beaten track, and endeavoured to frame a lease more in accordance with the spirit of the age, avoiding all interference with the capital of the tenant, removing all clauses that dictate as to the cropping of the soil, or as to the sale of the produce, and as far as I can, giving security for the capital invested. I have endeavoured to place my tenants in that position which I should like to hold as an occupier of land; and in doing so I am satisfied I have studied my own interest as well. That lease will be printed, and with as few legal phrases as is practicable; and I shall be happy to submit a copy of that lease to any of my friends who may like to see it, because I believe, with certain modifications, it may be adapted to many estates of this country, both for the advantage of the landlord and the tenant.

HARVESTING POTATOES.

THE repeated alternate fluctuations of wet, dry, and frosty weather have materially damaged the potato crop, and more particularly in old gardens, damp and stiff soils; so much so, that the loss may now be estimated at from 25 to 75 per cent., which are the greatest losses we have sustained for some years past. As the haulm is now quite dead, every opportunity of dry weather should be taken advantage of in lifting the crop, and selecting and storing the sound from the unsound. We have repeatedly recommended dry weather for lifting, and dry sites for storing these valuable tubers, and also dry light substances for mixing with the stored roots in either pits or houses, to absorb any wet or damp hanging about them, or, when they sweat, to prevent heating. Dry rabbit sand, dry turf-mould, dry coal ashes, or well-dried earth—all serve for this purpose, and there are few localities in which one or other may not be found at reasonable distances. Where the land is damp or heavy, the pits for storage should not be sunk more than 6 inches under the general surface, but where it is comparatively dry, the pits may be sunk to 1 foot or 9 inches deep, providing that a trench at both sides of the pit be sunk so deep as to be under the level of the floor of the pit; neither should the pits be made wide—18 inches will be wide enough—and, although it entails a little more trouble, the sound potatoes would be all the safer if small temporary parcels of them—of about 1 ton each—were clamped together in the field when first taken out, and lightly covered to keep out the wet and frost, where they may remain for a fortnight or three weeks to sweat before the final pitting, for if too many of them be put together when fresh, they may heat and ferment; but the best storage they can get is in dry, airy sheds, houses, or cellars, if such places can be afforded for that purpose. Even under cover, they should be mixed with any of the dry, absorbing materials already named, and covered with the same, or litter, to protect them from the light, for, if exposed to light, they soon get greened, unfit for eating, and poisonous.

Mr Bennett, in the *Florist and Pomologist*, amongst other details, recommends placing lumps of unslaked lime in baskets in the pits, in order to attract the moisture from the tubers, which, no doubt, it would; but the lime would soon slake, and lose its power of doing so. He also recommends dusting the tubers with lime for the same purpose. As a destroyer of the fungus that attacks the potato, and an absorbent of superfluous moisture, no doubt the lime will answer admirably; but lime is of so penetrating a nature that, if applied in this way in an effective quantity, although useful to preserve seed potatoes, it would spoil them for human use, so much so, that we have doubts of Mr Bennett having ever tried it. We did so in one of the early years of the potato disease, and although effective in preserving the tuber, when cooked they tasted so strongly of the lime as to be scarcely eatable, and when eaten, excoriated the throat. Such is our experience of the use of lime in preserving potatoes. We tried many plans of preserving the potato, the best of which we found to be packing them in dry sand or turf mould in the pits and in the house; on dry lofts covered with litter, which admitted air from below, and protected them from light above; and the ventilated pits, invented by the late Dr Halpin, of Cavan, models of which he deposited, which are yet to be seen, in the Agricultural Museum of the Royal Dublin Society. But the chief things to attend to are dryness, the use of plenty of absorbing materials, and ventilation to let off any heated air that may arise from and prevent fermentation, for which purpose there is nothing so good or so easily procurable as drainage pipe tiles.

THE CHALKING AND LIMING OF LAND.

By Mr F. EVERETT.

[R EVERETT said:—We know that every soil may be divided into two ons—the one organic, and the other in- ic. The inorganic or manurial substances soil are silica, alumina, lime, oxide of magnesia, potash, sulphur, phosphorus, ine, and fluorine. Among these, lime e of the most important, and enters largely into the composition of plants any other. Without its presence in the nearly all our cultivated plants refuse to sh; notably among farm crops—turnips, , and grass seeds. The importance of d root crop preparatory to barley, and d clover stub in preparation for wheat, t be over-estimated, and if by the ap- ion of chalk or lime we may reckon, olerable certainty, upon a good crop of and clover, we secure a good yield ghout the four-course rotation. I think ost practical men will allow that no at of farm-yard manure is an efficient tute for chalk where land requires it. roughly convinced am I of the import- f supplying lime in one of its various of combination when its application to il can be proved to be necessary, that I made the subject a special matter of y. It is eight or nine years since I had il of my own farm analyzed by Dr ker, believing it to be deficient in lime. e since proved the opinion then ex- d by him to be entirely correct. "It useless," he said, "to go to any great se in the purchase of manures till your as been either limed or chalked. It is emarkable, in my own case, how fully ence has proved to me the correctness above statement. "A dressing of " remarked an old farmer to my men last year, when busy chalking, "will do this land more good than all the dung in Newbury." Here at any rate there appears to be no antagonism between what is called theory and practice, Dr Voelcker and my practical friend being of the same mind. Before proceeding further, let me bring to bear the testimony of Johnson who, in his work on "Use of Lime in Agriculture," has placed within the reach of agriculturists the richest possible store of information with respect to the subject we are discussing. At page 124 of his work will be found the following remarks:— "On examining the chemical nature of the ash plants, it is found that lime in all cases forms a considerable proportion of its whole weight. Hence the reason why lime is regarded as a necessary food of plants, and hence also its beneficial influence in general agricultural practice. The quantity of pure lime contained in the crops produced upon 1 acre during the four years' rotation, amounts, on an average, to about 200 lb., equal to 360 lb. (say 3½ per cwt.) of carbonate of lime in the state of mud, shell-sand, or limestone gravel. It is obvious, therefore, that one of the most intelligible purposes served by lime, as a chemical constituent of the soil, is to supply this comparatively large quantity of lime, which, in some form or other, must enter into the roots of plants. But the different crops which we grow contain lime in unlike proportions. Thus the average produce of an acre of land under the following crops contains of lime:—

	Per Acre.	Grain.	Straw or Roots.	Tota lb.
Wheat	(25 bush.)	1	12	13
Barley	(40 bush.)	1½	15½	17
Oats	(50 bush.)	3	19	22
Rye	(26 bush.)	1½	15½	17
Beans	(25 bush.)	2½	34	36½
Turnips	(20 tons)	46	72	118
Potatoes	(8 tons)	8	31	39
Red clover	(2 tons)	—	77	77
Ryegrass	(2 tons)	—	30	30

per read before the Newbury Chamber of ture.

These figures speak for themselves, and in passing, I will only draw attention to the large proportion of lime contained in the turnip and red clover crops, which I have previously pointed out as crops especially benefited by the application of chalk or lime. Here I think may be aptly quoted Liebig's minimum law, which though for the present may be scorned by practical men, is destined ere long to be acknowledged as lying at the root of all sound practice, and is a safe guide to all who are not unwilling to confess that the researches of scientific men materially assist us in working out our every-day practice. "Every field," says Liebig, "contains a maximum of one or several, and a minimum of one or several, nutritive substances. It is by the minimum that the crops are governed, be it lime, potash, nitrogen, phosphoric acid, magnesia, or any other mineral constituent; it regulates and determines the amount of continuance of the crops. Where lime or magnesia, for instance, is the minimum constituent, the produce of corn and straw, turnips, potatoes, clover, will not be increased by a supply of even a hundred times the actual store of potash, phosphoric acid, silicic acid, &c., in the ground. But a simple dressing of lime will increase the crops on a field of the kind, and a much larger produce of cereals, turnips, and clover will be obtained by the use of this agent (just as in the case of wood ash on a field deficient in potash) than by the most liberal use of farm-yard manure." It becomes, then, a matter of primary importance to ascertain whether or not our land requires chalk. It is generally taken for granted that where roots "club," lime in some form must be applied to counteract this evil, and many years' experience has proved the soundness of such a conclusion. But I venture to think that there is a large area of land that would be greatly benefited by the application of chalk where the above direct proof of the necessity of applying it might be wanting, and where we must seek further for more subtle indications of the deficiency of lime in the soil. Many practical men may be able to call to mind cases in which they have not been satisfied with the general yield of their crops—though great pains may have been taken in their cultivation, and large outlay may have been made in the hope of profitable returns. I think that I could mention land and certain fields on some farms in this district, where, although the roots may not actually "club," yet there are indications that something is amiss—there is a short clover crop perhaps—a profuse quantity of weeds, or an unkind mechanical condition of the soil. Something is wrong, and yet we hardly know what. In such instances, I would suggest that it might be well to have the soil analyzed, and carefully to note the character of the weeds growing upon it. There are certain weeds which are almost a sure indication of a deficiency of lime; many of them flourish upon my own farm, and those farming land requiring chalk will, I feel sure, bear testimony that they are indicative of the absence of lime. Many must be able to call to mind instances where an application of chalk has entirely changed the unkind nature of the soil, and rendered land productive which previously was incapable of producing remunerative crops. I am disposed to think that "clover sickness," one of our stock grievances, is often owing to an insufficient quantity of lime in the soil, and it is stated by Sibson that the application of lime has, in some instances, proved a remedy for this disease. Another matter for practical consideration is the best mode of applying chalk, and the season of the year at which it is best to supply it. In connexion with chalking, I think there is one point which, though worthy of careful consideration, often is disregarded. I refer to the different quality and value of various kinds of chalk. It will often be found that chalk dug from different pits, though on the same farm, will vary considerably in chemical compositions and mechanical structure. Such is the case on my own farm. Suspecting it was so, I sent a sample from each of the pits I am working to be analyzed by Sibson. The

of the two samples shews the fol-
results :—

	No 1.	No 2.
.....	1.40	.38
e of Lime	93.42	98.33
Iron, and Alumina races of Phosphate ne.....	1.72	.62
te of Lime	—	.18
.....	3.46	.67
	100.00	100.00

2," Sibson remarks, "is much richer
carbonate of lime than No. 1, and
so a notable quantity of phosphoric
hich enhances much its value for the
The fact of its disintegrating better
in its favour, and it is evident that
scription of chalk should be used in
s where obtainable. A less quantity
would also suffice, and might be used
moderate quantities than is customary
district." I was anxious at the same
ascertain whether chalk containing
oric acid might be considered in any
a substitute for superphosphate in
tivation of roots. Sibson replied as
:—"A chalk containing phosphate
take the place, in part, of superphos-
although it could hardly be taken as a
ite." It only remains for me to re-
mark that I have purposely connected the operations of chalking and liming, because what we endeavour to effect in this neighbourhood by the use of chalk, what others in different districts have accomplished by the use of lime—that is to say, chalk or other limestone passed through a kiln, and deprived of its carbonic acid, in which form lime is more potent, but still in many respects performs in the soil the same offices as chalk. Pure lime is largely used in Scotland, and there farmers are especially careful to keep their land sufficiently supplied with it. Liming also is systematically carried out in south Durham and Worcester.

	Bushels.	Years.	Bush. in a Year.	When applied.
Roxburgh.....	200 every	19 or	10½	To the fallows.
Ayr (Kyle)	40 ,,	5 ,,	8	To the ley.
Carse of Stirling ...	50 ,,	6 ,,	9	Ditto.
South Durham ...	90 ,,	12 ,,	8½	Ditto.
Worcester	70 ,,	6 or 8 ,,	10	Before Grasses or tares

I am aware there is a prejudice entertained by some owners of land against the use of lime in a caustic or pure state, but it is a prejudice which, it may be hoped, will vanish under the light of more extended knowledge.

RECLAIMED LAND IN YORKSHIRE.

DER the heading of "A Ramble through Newburgh Park," a writer *Yorkshire Gazette* gives us the follow-eresting information regarding the re-ion of waste, or rather moorland, has been effected by the energy of Sir Wombwell. After entering into the istory of the family, the writer pro-hus :—

wold is the station for Newburgh, and ience to the Hall the visitor can hardly mark the beauty of the landscape, and y of the surrounding country. It is a sweet scene, answering to Sterne's description of a land "flowing with milk and honey." On one side of Whitestonecliffe, the last range of the Hambleton Hills, at the end of which is rudely, but plainly suclptured, a "White Horse." Before you is the vale of Mowbray and the chimneys of Newburgh Hall, and all around is peace and quiet. But on the top of the hills are wild moorlands, many of them no doubt as still and beautiful, but as little useful in a practical sense as they were when our far distant ancestors trode them. To one of such places we shall

trace our steps, though the energy of Sir George Wombwell has transfigured it. Passing through the Deer Park, which embraces an area of 500 acres, we rapidly rise to the hilly ground topping it. We pass through a grove of beeches, almost as fine as the Burnham beeches of arboricultural fame, and past a cover, where a fox is always found when he is wanted. In the higher reaches of the Park, there is nothing but wild moorland covered with ferns, brushwood, and briars, giving shelter to numberless rabbits. Ascending higher you come to the Lion Lodge Farm, where signs of active life and change begin to appear. On this hill top to which we have now ascended, facing the valley and overlooking the Hall, a great change has taken place within a short time. Four years since, that is, in 1867, it was simply a hill top clad with brushwood and ferns, and hardly worth 1s. an acre. Now fine crops adorn and enrich it. The steam-plough has been at work here. Let us turn to this 25-acre field which was only broken up last year. Previously it grew thistles and briars. This year it bears a good crop of potatoes, untouched by disease, and probably worth £18 an acre. To the left of it is a 25-acre field which has only been broken up this year, and will be sown with oats next year. The treatment is the same in each case, though different experiments are tried with happily the same beneficial results. The land is broken up with the plough, pared or scarified or stubbed, and then sown down with rape or turnips or potatoes according to the season, or the propabilities of success in each case. Another field was only broken up this year and was sown with turnips on the 20th of June. The crop is a capital one, not patchy but really good, and would stand a comparison with any in the neighbourhood. Another section of moorland was ploughed up on the 12th May 1870, then sown with rape, which was eaten off with sheep, and this year it bears an excellent crop of oats. The fields which have been longest under cultivation lie facing the valley, and bear this year very fine crops. They are 36 acres each in extent. One of them bore crops of potatoes two years in succession; this year it bears a splendid crop of oats, and in 1867 this land was not worth 1s. an acre. The second of the fields was sown down with turnips the first year, then with potatoes, then with two crops of oats in succession. A different arrangement was tried with the adjoining field, where the land was first sown down with turnips, then crops of oats followed in two successive years, and this year it bears a splendid show of turnips. Perhaps this experiment might have had a little effect on the trial of St Quintin *versus* Lett, for whatever might be said on the other side, the method in question certainly appears to have answered here. It ought to be added that geologically the land lies on the limestone, and two perennial springs bubble up, one on the side of the hill, the other near the top of it. From these two natural fountains the land may be watered at convenience. In all, the reclaimed land round or near Yearsley Moor amounts to 390 acres, which, with 200 acres near the Hall, makes about 600 acres entirely farmed by Sir George Wombwell. The steam plough was used in some cases, and in other instances horses were employed, and very heavy work it was for them. In the fields first broken up, six pairs of horses were nearly used up, and any one going over the fields which slope to the valley rather rapidly, and are at the same time undulating, will be surprised that no more were knocked up. Mr Watson, the farm-bailiff, calculates roughly that the outlay amounted to £10 or £12 an acre before a farthing could be obtained from the land, and no little credit is due to the enterprise of Sir George Wombwell, who ventured the outlay on what, after all, must be called an agricultural speculation. But that it pays, we have evidence before us. Paying is the test of quality in more than commercial pursuits. The man who makes two blades of grass grow where only one grew before, may be a benefactor of his species, but his example will not be followed unless he can shew that a lasting profit can be made over the cost of production. There, another spirited landlord is breaking up the moorland in order

to add not less, let us hope, to his own pocket, than to the extra productiveness of the country. How carefully these changes have been considered at Newburgh we see in another direction. All this newly reclaimed land lies high, and the wild blast from the east comes sweeping down the valley in stormy seasons. It comes fresh from the sea, which may be seen from this neighbourhood in a clear day. Hence the land requires shelter, and some three or four new plantations have been laid out, which, in a few years, will not only act as a cover to the crops, but will add picturesqueness to the landscape.

Now let us away to the farm house on the top of the hill, and on our way thither we may note that the whole of the reclaimed land has been fenced in with a good wall. Beyond the wall, the moorland crops up again; but on this side, the land bears "golden grain" or green crops, fresh and healthy looking. The farm house is the residence of the hind, close to the gates topped by two sculptured lions, which give the name to the lodge. It is a plain newly-erected building, but comfortable and substantial, with everything about it that denotes studied substantiality and practical use. There is an admirable fold yard in which are some excellent cattle, stables where some of the famous grey draught horses of Sir George are kept, and a capacious barn, roomy enough for a place of worship in a populous district. In an outhouse is an apparatus for steaming chaff, linseed, or potatoes. It is a most useful farm house accompaniment, combining economy in the use of fuel, with high practical utility in its general application. It is the invention of Messrs Amies, Barford, & Co., of Peterborough, and no encomium can be too high for it as it is spoken of here, but we are told the price is against its popularity, and this may probably afford a gentle hint to the inventors, to make a cheaper one if they can. A waggon rully, standing under a shed, meets with the same enthusiastic praise, but without the disadvantage of high price. It is a handy and even an elegant vehicle, combining the advantage of extreme lightness with handiness for carrying heavy loads. It was constructed by Mr Barker, of Dunnington. There is a deficiency of water at the Lion Lodge Farm, and Mr Watson is about to sink deeper for it, and as there are two perpetual springs on the other side of the hill top, we may anticipate that the experiment will succeed.

Such is the newly-erected Lion Lodge Farm. A few years years ago, the lodge stood, or would have stood if it had been erected, in the middle of a wild moorland. Now it is the head-quarters of practical improvement and what we may call good farming.

THE SEWAGE IRRIGATION FARM AT BANBURY.

THE utilization of the sewage of towns and villages is a subject which still ontinues to press itself upon the attention of he public; and the progress of the farms deoted to that purpose is carefully watched nd scrutinized, from a pecuniary point of iew, in this country. The farm at Banbury as attracted a good deal of notice, and we ow propose to chronicle the latest results rrived at there. The farm consists of 138 cres, and the whole, with the exception of a nall portion, can be placed under irrigation. At the close of 1870, the recorded sales of produce, including ryegrass, roots, oats, mowing grass, and other crops, amounted to £1435, 12s. This was exclusive of the keep of certain horses belonging to the Board of Health, and which are only occasionally employed on the farm. All expenses were covered by the receipts, and according to the official statement, a small surplus remained. At all events, the ratepayers are satisfied that the irrigation of the land is better than polluting a river, and incurring

enormous legal and other costs. During this present year (1871) there have been, up to the present time, ten sales of produce of various sorts, which have realized £1077, 10s. 9d. 26 acres of ryegrass have been cut three times (one more cutting is expected), and have realized good prices. 11 acres of oats made £15, 17s. 6d. per acre, and was a splendid crop.

The mowing grass has been cut twice, and the aftermath looks well, the quality of this grass having greatly improved since irrigation has commenced. Hassocks have disappeared, and wild clover grows luxuriantly.

There are now on this farm 18 acres of roots, chiefly mangolds, including 4 acres of swedes and kohl rabi. These have not yet been sold. The mangolds are particularly fine, and are well worth notice. 8 acres of ryegrass, which had been under that crop for five years, realized this season £12 an acre. It has now been scuffled; will be ploughed and devoted to roots next year. About 1 acre of land is being prepared for cabbages. There has been an abundance of grass everywhere during the summer months, and it is surprising that the ryegrass sold so well as it did. There are 100 acres adjoining the Board of Health farm (138 acres), and for the whole the Board recently offered the owner £23,000. From the experience now gained, it is considered, by many practical men, that sewage farms should be worked in connexion with a certain average of ordinary pasture where dairy cows could be kept. Ryegrass and roots would then be found to be very valuable. The profit that would arise from keeping pigs would also be considerable.

During the five or six years that this farm has been in operation, there has been only one complaint about the state of the river Cherwell, and that came from a miller at Twyford, about 3 miles from the sewage outfall, a few weeks since. The complaint arose from the cleaning out of certain carriers, which, during the dry weather, sent a black liquid into the river that was low at the time. Measures have been taken to avoid such errors in future. Urban populations should be satisfied at present if a sewage farm pays its way. Science may in time enable us to extract various matters from sewage, before being applied to the land, which may greatly enhance its value.—*The Field.*

AGRICULTURAL NOTES

By Mr J. J. MECHI.

THE *Steam Driven Pulper, Chaff-cutter, Grinding Mill, &c.*—It does astonish me exceedingly that farmers of 400 or 500 acres of land, having plenty of capital and live stock, are so blind to their own interest as to be without steam power (fixed or moveable) for the purposes of stock feeding. On my little farm of 170 acres, with some 20 or 30 bullocks and 200 sheep, I should be completely at sea without steam. My Bentall's pulper, with some 160 steel teeth revolving rapidly on an Archimedean screw, chews up in an instant, a great cabbage or mangold, and as it is spread out, on comes a layer of steamed chaff, malt combs, bran and cake, piping hot, brought from the coppers, so that it ultimately all forms a sandwich several feet high, ready for Sunday's dinner. How people can endure anything slower than steam, I cannot comprehend. Then there is the "millering"—such a packing up and fetching back sacks of corn, waste of time and money, that I really think my farming friends are not half so sharp in these matters as they are in the matters of buying and selling. I have worked my fixed steam-engine for twenty-four years, and Bentall's pulper for fifteen years, so I sent it to have 160

new teeth put in. They were put in mathematically true, and properly wedged up by machinery in about ten minutes. I should estimate the human labour to accomplish this at under 2d. What a lesson for agriculture! When our teeth are worn down they wont bite properly, and so it is with the teeth of harrows and pulpers. Nothing like keeping everything sharp, including the mental or calculating faculties. Just start the riggers and down come showers of chaff, lots of broken cake, pulped food, water for stock, and all this while the great mill stones are filling your sacks with bean meal and ground oats for your horses and cattle. Even the grindstone is at your service, so your scythe or other tools may be always in proper order. Every young farmer should receive a steam education, if I may so call it, and no doubt he will, as the old folks die out. He will have grown up in a steam age, and not under the old slow-coach *régime* of dear hand and horse power. The cheapest arrangements for steamed food are some great cast-iron pans or coppers, deep and wide enough for a man or boy to stand in and mix up the baskets of chaff, malt combs, bran, and cake as they are brought and thrown into the copper. Mine have been in use more than twenty years and are of cast-iron, of the following dimensions—3 feet deep, 4 feet wide, inside measure. We fill them until they are piled up like a cone. They are surrounded by 4½-inch brickwork, waste steam passing around them on its way to the atmosphere. The advantages, as regards the well-doing of the stock, are unmistakeable. The pulped food alone, without steaming, is far superior to cut roots—and especially when given warm, as ours is. The animals fill themselves quicker and better, are less liable to flatulence, and are entirely free from the risk of choking. Is it not very desirable to communicate such facts to each other? I think it is.

My Rotation of Crops on Heavy Land.—1st year. Red clover after oats once mowed for hay, afterwards top-manured with ten loads of shed manure, then close folded with sheep, eating cake, corn, malt combs, and bran. 2d. White wheat, drilled 9 inches apart; 4 pecks of seed per acre; horse-hoed twice, and well hand-hoed in spring. 3d. Rivett wheat, same quantity of seed as white wheat, but manured with 2 cwt. of Peruvian guano, and 1 cwt. of salt. 4th. Mangold; land broadshared after harvest; weeds, &c., harrowed and burned. Twenty-five loads of shed manure spread in October or November. Land trench-ploughed, two horses in front plough, followed in same track by iron plough (breast taken off), drawn by four strong horses. Land lies until early in April, then broadshared; 3 cwt. of Peruvian guano and 2 cwt. of salt worked in, and mangold seed drilled in rows at 28 inches from row to row. Time of drilling, April 15th to 20th. Seed previously soaked in the wet sand for a few days. 5th. Wheat. Sow in November, with 2 cwt. of guano and 1 cwt. of salt. Land scarified after harvest; weeds and stubble collected and burned. 6th. Beans. Twelve loads of shed manure carted and spread, and land ploughed very deeply, with three horses abreast; drilled at 18-inch intervals. The pressure put on to the drill, so that the coulters should cut through the furrow slice, and deposit the beans deeply in the solid subsoil. 7th. Wheat, either white or red, drilled in October or November, with 1 cwt. of guano, and 1 cwt. of salt, the bean stubble having been cleaned, cross-ploughed, and then ploughed into form ready for the wheat. 8th. Winter tares. Wheat stubble scarified and cleaned, and 2 bushels of tares drilled per acre. No manure applied. Tares cut in May and June, passed through the chaff-cutter, and given to horses and cattle; rest made into hay. 8-A. Cattle cabbage same year after tares. Land heavily manured with twenty-five loads of shed manure, then deeply ploughed and trench-ploughed, same as for mangold. Cabbages planted out at intervals of 28 inches, the lines being drawn by the drill. Cabbages consumed in early spring by ewes and lambs, and some pulped for the cattle. All, however, taken off the land. We generally have 2 or 3 acres of cabbages planted in March, and consumed in September and October. 9th. Oats. 2 bushels per acre, drilled at 6-inch intervals, sown down with red clover. Manure: 2 cwt. of guano

and 1 cwt. of salt. The beans and wheat, mangold and cabbage, are all horse-hoed with Garrett's patent horse-hoe, two or three times, and also hand-hoed. The knives are changed according to the width of drill. A man and pair of horses do 12 acres per day.

My Rotation on Light Land.—1st year. Red clover mowed for hay and then fed on the heavy land; sometimes manured after first cutting. 2d. Wheat. 3 cwt. salt sown early in spring. 3d. Barley (sown down with Italian rye-grass); 2 cwt. guano, 3 cwt. of salt. 4th. Italian ryegrass, well sewage-irrigated, and cut several times. 5th. Italian ryegrass, fed and mowed. 6th. White peas, sown in January, and picked green for London market. The pea haulm removed to another field for making, and the land cleaned and sown with—6-A. White turnips, fed off, with cake, corn, &c. 7th. Wheat, sown in December, 3 cwt. salt in spring. 8th. Barley, sown with red clover, and manured with 2 cwt. guano and 6 bushels of salt.

Reform in Live Stock Management.—Venerable agricultural customs, be they as dear to us as they may, by long indulgence and use, must give way to a more modern and different practice if the latter is proved to be the most profitable. I therefore predict that the days of open farm-yards, exposed dung-heaps, and the roaming at large of farm animals, are numbered. Their abolition will be a long and big job, but we must keep pegging away for the individual and general good of the country. One of the great advantages of this change will be the removal of those great fences that were considered necessary for the shelter and restraint of animals roaming at large. Our cattle will be in covered and enclosed yards with paved floors and amply ventilated roofs, and our sheep, including breeding ewes, will be fenced in with iron hurdles on wheels. A patch of pasture or Italian rye-grass will be permissible in fine weather for our breeding cattle and sows. Dung-heaps, except an occasional one for odds and ends, will not be required, for the manure will be taken out of the covered and paved yards in a fit condition for spreading and ploughing, neither too wet nor too dry. Cattle will never be without free access to water, and also to rock salt in the mangers. Their food will be composed of a considerable variety, intermixed and prepared, and seasoned with condiments. I use Simpson's Cattle Spice. The same remarks as to water and feeding will apply to sheep in the fold. When cattle are grazing, they take much exercise, especially if the land is poor and the food sparse; but in the cattle shed they stand at the manger, fill the first stomach quickly, lie down, and ruminate, thus making the best use of their food. Animals will grow and fatten faster this way, and consume less food, than when roaming at large. They are more healthy, they lie on a warm and dry bed (for straw is a non-conductor of heat), in a well-ventilated shed, and they are free from those atmospheric changes and dangerous lying on wet grass (damp sheets). They are infinitely less subject to death or disease under cover, than roaming at large. This I have proved by twenty-five years of practical experience. At present we are rather in the dark as to causes of disease, but I have found when I did have any losses it was by animals exposed to atmospheric vicissitudes. The east wind, that blights our hedges with caterpillars, often produces disease in our sheep and cattle. Sheep should never feed off grass or clover without cake, corn, or other food. The rot, or fluked liver, is prevented by giving to each sheep 1 pint or less of barley daily, even when on pastures or meadows known as causing rot. Old short-woolled, broken-mouthed ewes will fatten rapidly in a warm ventilated shed or stable, if fed on pulped roots, chaffed grass, cake, meal, &c.; but they might ramble a long while on poor pastures, in autumn or winter, without fattening. Old folks like warmth and shelter, and so do young ones in wet or cold weather. Long-woolled sheep can best withstand cold if the weather is dry and the ground not wet. Fatting sheep do well on sparred floors, or on burned clay ashes.

Beware of a Savage Stockman or Groom.—The losses arising from a severe or brutal treatment of animals is considerable, there-

tly satisfy your mind as to the treat-
stock receive.

for Thatching.—Never, if you can use new, reedy wheat straw for g. Thatchers will tell you that the ll find its way between the circular les of the straw; but old wheat straw ed flat, and often split, by pressure tack, so that it forms a compact and ering. I always thatch all my straw, a handy parcel of old straw for thatch- any farmers leave their stacks un- till heavy rains set in, which fre- prevail in the autumn. Straw re too often left to rot unthatched.

e Hall Farm (see p. 1209).—Good , in his zeal, has greatly over-valued y land and my exertions. As to , all I desire is the honour of hav- n useful to the agriculture of my

Growing, or Couch-grass—Which is it to be? For they can't grow satisfactorily, seeing that the power- ch-grass, twitch, squitch, or what- e it may be called, will be master of ation. In old-fashioned farming, a llow was made to get rid of twitch, he ploughing was deep enough and t enough, and if the summer was hot y, the twitch went to the wall, out, n, especially on undrained land (for is a lover of moisture), the long fallow its object, and proved to be an unpro- investment. There is a rare supply of this season, and as I want to grow orn crops pretty frequently, I take es- care (cost what it may), to fork it out land, shaking it from the soil, and it away from the field to be destroyed. ver there has been an old ditch, old and trees, which once abounded on n, the twitch will crop up from some buried joint of an antient stock, in twenty-eight years of constant war it. Still we are, to a certain extent, s of the situation, but it costs in such n as this from 5s. to 15s. an acre to it. When I was once gently doubt- propriety of a pasture of twitch on a stubble, the farmer exclaimed, "Why, what should I do with my heifers after harvest if I had not this feed for them?" I gave up argument at once as a hopeless affair. I remember seeing enormous stacks of it years ago in Lincolnshire, as I passed by rail, intended for making paper, but I believe it was not a success. Most of mine is young twitch, but where the old ditches were, there are some tough old fellows that have got an anchorage at unknown depths, and they will shew their noses, and seem determined to share the good things with the roots of the future corn plants. I wonder how much twitch costs the country annually. Would a million sterling pay for it? I think not. It is painfully interesting to see how, just now, the twitch plants are pushing forth their strong, white, devouring snouts. The Suffolk folks call it spear-grass. I remember raising a considerable storm of indignation at an agricultural dinner not 100 miles from Watford, because I gently doubted the good taste of holding the agricultural show in a field matted with this noxious weed. As my bailiff says, if a farmer allows twitch to be his master, it is sure to ruin him. It is a very insidious weed, for although on the surface you only see its narrow green leaves, its underground formation is a mass of strong sharp-pointed piercers or spears, half as thick, and almost as stiff, white, and straight as a tobacco-pipe, forcing their way bodily and rapidly into the soil in every direction where the best plant food is to be found, and carefully avoiding the subsoil where it is poor and undisturbed. None of our cereal roots have a chance with it, for it pre-occupies the ground, and holds possession by superior strength and tenacity. The only plant that appears to me to have a chance with it is the powerful bean tap-root and side shoots, which resemble it in strength. As one of my men said to-day, when he was forking it out, "Old ditches should, before they are filled up, have their sides and contents brought to the surface and spread, so as to get out the twitch, otherwise when merely filled up, the twitch will retain its vitality and come gradually to the surface,

although a yard or more deep." I have a field of 8 acres which grew 7 qr. of wheat for its last crop some five years ago. I laid it down to grass, and for two years had first-rate crops, but soon the indigenous twitch took possession of it, and despite of ample manuring and folding, the crop has been "no go," so I shall break it up, and it will then, I know, produce me abundance of other crops. Most of our poor worn-out pastures are mere beds of twitch, and no doubt it is a great mistake to permit them to remain as permanent pasture. A couple of years in grass is quite enough in such soils. This I have proved by experience on my soil. Of course, something depends upon sowing genuine grass seeds, and taking care that the ground is cleared of twitch previous to sowing; but herein is the difficulty, for a piece of dirty-looking twitch, which you think is dead and so pass over, has retained its vitality, and only awaits favourable moisture to start it again.

Rats in Corn Stacks. — Nearly all my stacks are on Garrett's patent iron stack frames, twelve of which I have had for twenty-five years, and now they are as good as new. But I had occasion to place one wheat stack on the ground, and although my buildings are free, or nearly so, of rats, within a fortnight my corn stack has been populated by them, and I must thresh it out immediately, or I shall, like one of my neighbours, find I have nothing but straw. He left two stacks unferreted for two years, and on threshing, found no corn in one, and only 5 qr. in the other! As he has passed away, I may now mention it as a warning.

Wet Corn Stacks.—Can any one tell me how much is the total amount of loss, this wet September, caused by unthatched stacks? I know of several instances where the corn has speared or grown from 1 to 2 inches in length; the stack, in fact, tied into one inseparable mass by the multitude of fibres, and the grain rendered partially or entirely worthless. The excuses for this are various. One had no straw, and no time to thresh; another meant soon to thresh, and so would save the cost of thatching; others had straw, but trusted to fine weather, or rather, the expectation of it, forgetting that harvest was later, and that September is a risky month for rain.

The Geological Map of Great Britain hangs in my study, reminding me, by its many coloured patches, how wrong and unreasonable it would be to recommend a uniform agricultural treatment, or one unsuitable to the formation, elevation, aspect, and latitude of the greatly varying soils and districts. Need we be surprised that our eastern and south-eastern counties are cereal, dry and warm in summer, cold and pinching in winter and spring, seeing that we there get the first of the sun aud the last of the clouds, which, rising in the Atlantic, are well strained of their heat and moisture by Ireland, and then by the wide intervening space of land between the Irish Sea and the eastern coast. Cornwall and Devonshire, pushed into the Atlantic, meet the warm Gulf stream and luxuriate in its exhalations. An east wind in July and August parches us up in Suffolk and Essex, for it comes over an immense extent of land, while, under the influence of a westerly gale crossing to us over some thousands of miles of the Atlantic, the heat is moderated by moisture, to men, plants, and animals alike. This subject might be greatly extended, but enough has been said to shew how necessary it is to consider all the conditions before applying any particular agricultural treatment either as regards soil or crop.

Preserving Root Crops.—We all know that root crops are costly, and that, having grown them, the question arises how to preserve them from injury or waste, and how to get the best price for them from our stock. I can never believe that it is a profitable plan to leave them in the soil, unprotected by their leaves, and deteriorated by frost. One of the best and most extensive root-growers known to me, invariably clamped his swedes very early in November, in small heaps, well covered with earth, ready for feeding in the field in the winter or early spring. The cost of doing this is amply repaid, and, as I am successful in preserving my mangold, I will state what I believe to be the reasons for my success. I have just finished some very fine

lmost as fresh and juicy as when
A mangold is never in greater danger
ıg that when it comes up clean and free
rth, for its fibres have then nothing to
e their vitality. I consider it a bad
let them lie on the field in heaps
ılling. Mine are always thrown into
: as they are lifted from their place,
once placed in the clamp. As I do
l them until late in October or early in
ber, a certain amount of damp or wet
lheres to their roots. Those with two
: fangs always keep best. Those with
e fine tap-root hold little earth, and
ıently rot early; so we use that sort
r consumption. We thatch the clamp
ft barley straw, which lies close, and
ut both frost and heat. Hard glassy
ıeat straw won't exclude the frost.
later we earth them up—that is,
round the clamp, and enclose them
ck cover of earth. They keep good
ptember or October.

v in the Morning, and sometimes late
, you may, by an occasional look-out
.t is neither profitable nor agreeable.
ıg man who complained of farming
ised by a sagacious friend to go of a
's morning about daybreak, and drink
of water from a spring at the farther
the farm. The very first morning
did so, he found a neighbouring per-
ing out his horse, &c., that had been
all night in his fields. I know of an
: where a cunning fellow always turned
e out at night, and fetched it home
daybreak in the morning. It was
ı people's fields, or lost. A farmer
ɔffered a shilling to his men every
:y could take it to the pound. This
the matter, and the offender soon
horse. A great many things disap-
m a farm late and early. Wood, and
als, sometimes walk off.

Tint to Coursers.—A farmer aquaint-
mine, who had greyhounds, was always
ı having hares on his farm, although
ıot preserve. Hares always make to
where they get taken by the poachers.
mer caught his hares at night, in a
gate-net, and gave them a sound whipping with a lady's riding whip. He then turned them down, and however sharply driven, they would never attempt a gate a gain.

Pasture.—Most of our old or permanent pastures, on certain soils, are weedy, exhausted, and unprofitable. If pasture is desired, let it be laid down for two or three years, but no longer. Hay crops are generally good the first and second year after laying down, but soon become weak and unprofitable. This I know from practical experience. Cultivation is so fertilizing and valuable on certain, and indeed on most soils, that the absence of it for any length of time is decidedly unprofitable. Of course there are exceptions to this rule.

Waste Brings Want, and this as true of a nation as of an individual. At the present rate of waste of the constituents of our food after we have consumed it, the nation must become *pro tanto* poorer and more dependent on other nations for its supply of food. London alone sends into its Thames, in seven years, the whole of a year's produce of the United Kingdom, or its equivalent, which costs about £150,000,000; and as our town populations are estimated at 15,000,000, the waste in seven years is that from food which has cost £1,000,000,000, or much more than the total amount of our national debt. These are not imaginary figures, as I shall now prove. Our population is 32,000,000, our farmed area is only 46,000,000 acres, having, at £4 an acre, an annual produce worth £184,000,000; so that 1½ acre of British soil is not near enough to feed each individual, and we, therefore, have to draw upon foreign countries for the remainder. As their production of food per acre is less than half that of our own (in some cases not a-third), another 20,000,000 of acres are probably required to supply us. I speak of bread, meat, potatoes, butter, and cheese, and leave out of consideration the vast area of land required for tea, coffee, sugar, wine, spices, &c. Well, then, we require 2 acres each to feed ourselves and our horses—I mean the available produce of 2 acres, because the farmers have 1,000,000 of farm horses which consume, probably, the

produce of 4,000,000 to 5,000,000 of acres; licensed, or taxed horses, non-agricultural, number 1,500,000, and they no doubt consume the produce of some 5,000,000 or 6,000,000 of acres. If I add to that of our own production all the tea, sugar, coffee, wine, &c., received from foreign countries, and consumed in London, and all the products of our fisheries, the amount I have named will be vastly increased. It probably takes the available produce of 20,000 acres to feed Londoners for one day, and 20,000 acres to feed their horses for a week. To what extent, in manurial money value, do we Londoners thus withhold from the land? Mr Lawes, and our other chemical authorities, estimate the manurial results of its consumption of food at per-centages, according to its constituents, varying from 10 to 40 per cent. of cost. We may, therefore, safely value the voidances at one-tenth of the value of the food consumed. At this rate the loss to London might be put at £2,000,000 sterling annually, or for all the towns of Britain £10,000,000 annually. There is an unerring way of testing this question—a crop grown on 1 acre, if consumed on that acre, will fertilize it, but if the crops of 2 acres are consumed on 1 acre, the fertilization is amply sufficient to produce a great crop. Therefore, if each individual on an average consumes the produce of 2 acres, the voidances resulting from it, if all economized, ought to fertilize 1 acre. On this principle or calculation, the population of London and their horses should fertilize 3,000,000 of acres annually. Of course there can be no reasonable hope of this taking place, but it illustrates the folly and waste of applying the annual voidances of fifty people to a single acre of land, and continuing to do this year after year. Even at this rate, 60,000 acres would be required to utilize the sewage of the 3,000,000 population of London. This question is of such importance nationally, that our Legislature and Government should, in my opinion, take initiative action upon it, by the purchase of a sufficient area in various directions, and a re-sale when properly completed. The City of Glasgow, by a single pipe of 4 feet diameter, and a fall of 5 feet per mile, has, at a cost of a million sterling, obtained from Lock Katrine, 40 miles distant, 22½ million gallons of pure water daily. Steam power would, at a cost of 8s. 6d. per 1000 tons of sewage, raise it 200 feet high, which, at a fall of 5 feet per mile, would convey it 40 miles away from London. But then the sewaged land must be drained, naturally or artificially; so it is a "big job," which will ultimately force its way to a solution. Still, as compared with our railways, it is, for engineers, a very little job. It was estimated that we shall require this year 13,000,000 qr. of foreign wheat independent of our enormous imports of other kinds of grain, meat, butter, cheese, and a million of foreign eggs daily.

Occasional Papers.

A TRIP TO ALDERSHOT AND WAVERLEY ABBEY.

A STRANGER on visiting Aldershot for the first time can hardly fail to be struck with the strange appearance it presents. On leaving the station, he comes at once to the navvy-looking huts of the north camp, but as he approaches the town, the south or block camp comes into view. The moor land all about is now getting brought into use, and generally the appearance of the locality is flourishing.

The hop season in this locality has this year proved pretty much of a failure, and fears are entertained of the coming winter proving a hard one for the labourers. Agriculture is far from being in a flourishing condition hereabouts, the fields in the direction of Ash are ill-managed, not well wrought, and everything looks filthy and squalid. The houses appear to be kept in an untidy state, and the dung heaps look as if purposely placed as near the houses as possible. Near Tongham station, two or three men could be seen mashing turnips to be ploughed in as manure—not a usual thing especially at this season of the year. On a farm where better things might have been expected, the flail could be heard, and on making inquiry it turns out that it is still used to a considerable extent in the district. Altogether, in the management of the land, and the breeding of stock, the district of Aldershot is quite a-quarter of a century behind the age, which the use of wooden handed ploughs seems enough of itself to establish.

Waverley Abbey is a favourite place of resort, and it attracts visitors from London, and Yorkshire, as well as many other parts of England. The name, owing to the writings of the immortal Sir Walter Scott, is enough of itself to excite great interest. The walk to it by Moor Park is a truly delightful one; it is shaded by beautiful trees which at present present quite a picturesque appearance, owing to the change in the colour of the leaf. All kinds of timber thrive in this favoured spot—oak, beech, elm, larch, and Scotch fir, birch, lime, poplar, ash, but they all grow much as they like, as forestry does not receive much attention, or at least not nearly so much as it ought to do.

On nearing Waverley Hall, one cannot fail to notice, with admiration, the tasteful porter's lodge, erected at the entrance. It is the most beautiful we remember ever having seen—and we would earnestly recommend it as a pattern to all noblemen and gentlemen proposing to erect such buildings. It would have indeed been difficult for the Churchmen of old times to have pitched upon a more loyely situation for the erection of an abbey than the one selected here. It stands in nearly the centre of a flat, about 1 mile square, which is watered by the river Wey, and it is enclosed on all sides by raised hills, thus presenting a nice picture, fully framed, although not glazed. The top of the circular mound is planted with thriving Scotch fir, which adds immensely to the beauty of the whole. The abbey is now only represented by a few broken down walls, which are covered with ivy and other plants, and which will, in the course of time, finish the demolition of the remains. There is one covered-in apartment, with three pillars and a groined ceiling, which is taken some care of; and there is a window in the west transept tolerably entire, although every accessible stone is disfigured with the names of visitors cut deeply into it. The abbey does not look as if at any time it had been an imposing structure; but doubtless the inmates lived a jolly life within its walls—drinking the best ale, eating the best-fed oxen, and enjoying a haunch of venison from some of the neighbouring forests, parks, or chases.

The abbey was founded in 1128, by William Giffard, Bishop of Winchester, and it became the residence of a dozen of monks and an abbot of the Cisterian order—a break-off from the Benedictines. The abbey is only about 2 miles from the railway station at Farnham, and the walk is a very pleasant one. In the woods the

brake and heather grow luxuriantly. There are not many rare plants to be collected in the locality, yet the whole are of an interesting description, and would well reward the botanist or amateur collector of wild flowers. Curiously enough, the fallow deer do not seem to thrive in the locality, for although a herd of them near this have plenty of grass and shelter, they are quite stunted in growth and do not shew the antlers those bred in the woods or among the fastnesses of the north, do. Highland cattle thrive well upon the meadows—their graceful and shaggy appearance giving an artistic effect to the landscape.

Altogether, a visit to Waverley Abbey will be found to be a great treat, and we would strongly recommend it to the notice of tourists in pursuit of health and pleasure. D.

Our Library Table.

Trees and Shrubs for English Plantations. By AUGUSTUS MONTGREDIEN. London: John Murray.

THIS new candidate for public favour, like all other books, has its merits and its demerits. It professes to do a great deal in the way of disseminating knowledge, and it does so, but the knowledge it disseminates, we opine, is not always of the kind its author intended it to be. It is a sort of quasi-scientific diagnosis of 621 species of trees and shrubs "suitable for English plantations." Had our author abandoned the scientific diagnosis, which is scarcely complete, and given his readers some practical information upon the habits and characters of the trees and the shrubs he selects, as well as some of its distinguished fellows that he leaves out in the cold, we should have been vastly better pleased with the production, and it would have been decidedly a far more popular work. To amplify, by additional detail, some of the trees and shrubs noted in Loudon's "Arboretum," is good enough in its way, and to specify some of the novelties that have been introduced since, is also good and proper; but there might have been a good hundred species left out of the list, and another good hundred taken in their places. Still, when we take into consideration that the writer speaks from personal experience, that, in fact "he has made the arboricultural branch of botanical science a special study for many years, that he posesses in his own grounds specimens of nearly all the species he has described, and, in most cases, the descriptions are based on his personal examination of the living plants," we must take the book for what it is worth, and judge it upon what it contains, rather than be discursive over what it omits. One word more upon the presumption of the author, and what we have to say will afterwards be words of approval. If the author has made the arboricultural branch of botanical science a special study, how has he foundered so dreadfully upon the simple question of nomenclature? Not to speak of the question of division of species at all, what school of botanical science, we would ask, permits such species as Abies nigra and Piceas nobilis, to be ranked in the same specific terms of distinction as Abies Menziesii? The rendering of Abies Canadensis or Cephalonica might be permissible; but those specific terms or surnames, indicating colour, or habit, or form, to be placed on a level with those bearing Latinized English names of individuals, does not shew much acquaintance with "the arboricultural branch of botanical science."

Decidedly the most useful portion of the book is contained in Part II. The classification of species into groups with reference to their foliage, is an instructive chapter, and will be found to be valuable matter to all who read it. There are also chapters on evergreen plants, fine-foliaged plants—plants remarkable for the beauty and diversity of colour of the leaves. Then there is a chapter on the classification of species into groups with reference to their flowers. There is also a colour table which provides a ready reference list to all inquirers. There is also a classification of species with reference to fruit and also as to their value as timber trees. Chapter XIII., on the different forms of tree life, is a most instructive one. It contains lists of species with fastigiate, horizontal, or pendulous branches; of those remarkable for the singularity of aspect; of such as are remarkable for rapidity of growth; of those suitable for hedges; of such as thrive under the drip of trees, or in the smoke of cities, or on the sea coast, or in peat soil, or in swampy places, or such as form suitable cover for game. As indicating the mode of treatment, we quote from List 31, page 306—

"SPECIES THRIVING IN THE SMOKE OF CITIES.

"Of course the expression 'thriving' is to be understood as merely comparative. No plant can either grow or flower so well in the impure atmosphere of large towns as in the open country. But whereas most trees and shrubs dwindle away and die under the mephitic influence of air surcharged with carbon, &c., there are a few that will withstand it tolerably well. The list is not a long one, but it may be hoped that further experiments will be made with a view to extend it. Æsculus Hippocastanum; Ailantus glandulosa (a large tree with beautiful leaves, much used for shade in continental towns, and amongst other places on the Boulevards in Paris); Ampelopsis hederacea (the Virginian Creeper); Amygdalus communis; Artemisia abrotanum; Aucuba japonica; Catalpa syringæfolia; Cydonia japonica; Cytisus Laburnum; Ficus carica (the fig tree occasionally found in odd out-of-the-way nooks, court-yards and close areas, not fruiting, but freely producing its beautiful large leaves); Hedera helix; Jasminum officinale (the Cape Jasmine, whose introduction dates earlier than our earliest gardening records); Ligustrum vulgare (and probably the lucidum); Paulownia imperialis; Phillyrea media; Platanus occidentalis (the plant which of all larger trees is probably the one which answers best for city cultivation, owing to its smooth leaves and ever-peeling bark); Quercus Ilex; Rhamnus Alaternus; Rhus typhina; Ribes sanguinea; Robinia pseudacacia; Sophora japonica; Viburnum opulus."

The Plain Path to Good Gardening; or, How to Grow Vegetables, Fruits, and Flowers successfully. By Samuel Wood. London: G. T. Goodwin.

AMONG the thousands that live and enjoy life in the suburbs of our cities and in the country, there is a manifest disposition to grow flowers. Wherever there

is a bit of garden ground, and the party in a position to keep it, there you will see a variety of gardening, some growing their bedding plants, some upholding the herbaceous mixture, some taking to the cultivation of selected deciduous and ornamental plants, some to fruit growing, and some paying more attention to the production of palatable vegetables in the back garden; but all doing more or less for the gratification of the pure and heavenly pastime of assisting Nature in the development of her subjects. Indeed, as the poet has well expressed it:—

"How various his employment whom the world
Calls idle, and who justly, in return,
Esteems that busy world an idler too!
Friends, book, a garden,
. . . . . .
Dressed to his taste, inviting them abroad;
Can he want occupation who has these?"

Just so, and his occupation in the garden is much simplified if he can be guided by the "Plain Path." Gardeners often forget that gardening is not confined to the class to which they themselves belong. Every man has a right to garden, and to enjoy gardening, and it is wisdom to encourage all in the discharge of their pastime work.

Our author touches upon a great many subjects in a pleasing way, not to engage and stupefy the brain in conning over and studying, but to apply and digest the information as he or she reads. Time is becoming more precious every day of our life, and the more simple we can present useful information, the better will be the response. We don't want horticultural essays so much for the learners of the art: we certainly want a plain path, and Mr Wood will in all likelihood become all the better known to and appreciated by the public, that he presents his ideas as simply and forcibly as he can.

His description of kitchen garden routine is very full, touching upon the various operations throughout the year, and how these ought to be done. He is right in enforcing the precept put forth in a negative and positive direction. "There is one error commonly committed in regard to villa gardens, viz., a wish to grow a 'little of everything,' which means not growing anything well. This is not the way to perfection, as more room is required than can well be afforded for 'everything.' Perfection in gardening can only be obtained by a proportionate variety of well-assorted articles to match the scale of the place." There are also good articles on Grape and Melon and Cucumber growing, as well as on all subjects in the fruit way, common in limited gardens.

The division of the book on Insects is not the least instructive, as shewing how they attack the various plants, and the remedy, and when and how it should be applied.

The Flower department is very well done, scarcely any subject of importance is omitted, and all rendered in a succinct and concise way, for the particulars of which we must refer all interested to the book itself. It is particularly a villa gardener's book, and should be placed in all villa gardeners' libraries, touching as it does upon the general run of subjects that are from time to time introduced in our columns. Let us lay down the book with presenting the following quotation:—

"Cut flowers may be preserved longer by dropping into the water in which they are placed, 5 grains of saltpetre, and by keeping in the water a good lump of charcoal; either of these means will act benefically to cut flowers. Five or six drops of a saturated solution of ammonia dropped into a pint of water in which the flowers are kept, is also beneficial. The flowers, whatever they are, should be cut clean, *i.e.*, the stem should be cut in a solid part, or unfractured, with a fine edged pen-knife, budding or trimming-knife, as though it were expected to strike root."

The Garden.

EVERLASTING FLOWERS AND THEIR MANAGEMENT.

) flower garden should be considered complete without an assortment of ting or eternal flowers. For their re- , of life-like appearance long after the of growth, and, if properly gathered ied, their ability to endure great ex- constitutes qualities valuable enough to this modest sisterhood to as much at- as we pay their more beautiful, yet and fleeting relatives.

ugh devoid of fragrance and of such ency as to be, in degree, unsuitable for ouquets, they are very desirable as)wers. For wall-decorations and other :ntal purposes, especially when living cannot be procured, or, from their tibility to decay, these dried flowers are)propriate. On festive occasions, within during the winter and early spring, and seasons out-of-doors, the continual ıess of their presence is always agree- while, for cheering funereal solemnities, ıdorning the burial places of the dead, ınwithering properties, typical of the ıging love of the bereaved, and also ling us of the imperishable glories of rnal world, they seem peculiarly fitted.

foliage of these plants, of a more ent nature than their blossoms, withers ıght and falls at the touch of frost; its place must be supplied with other e when the dried blossoms are taken :orations. This the evergreens furnish; lub-mosses — Lycopodiums — suiting e character of the Everlastings. Lyco- ı Selago, the Fir Evergreen, and L. ıideum, the North American fan Club — bouquet green, as it is called, e of its extensive use in making :ts of fresh flowers, are the best is purpose. They grow in damp woods, particularly among Firs and among the roots of Spruces. If gathered at any season, and kept in a damp, shady place, they retain their liveliness of hue as well as if growing in their native soil, but the autumn is the best time to secure them, then they are at maturity. They adapt themselves well to cultivation in moist soils, in shady situations, if covered with dead leaves through the cold weather.

Great quantities of Lycopodium are in demand in early winter for Christmas decorations, both of churches and dwellings, and the manufacture of memorial devices for the cemeteries. These are generally made entirely of Evergreens, or sparingly illuminated with the dried Everlastings, which are introduced amid the green with effect. Emblems can be obtained at seed shops; or their uncovered frames, wreath, half wreath, cross, crown, anchor, and other shapes—can be procured at the same place, and the evergreens and flowers easily arranged upon them at home by any lady, who will doubtless find it a pleasant task to weave with her own fingers the verdure she has gathered, and the flowers she has herself raised, into these offerings of reverent affection for the last resting-place of her loved ones.

The frames are of stout wire, and of light wood, sometimes overlaid with silver paper or tin-foil; but a coating of green cambric or paper is preferable. To cover a frame, hold it in the left hand, place a few sprigs upon it, in a row, and keep them there, while, with the right hand a cord is passed over their stems, binding them close to the frame; then arrange another row, in such a manner as to hide this cord and the stems of the first, as well as the material of the frame; and so add row after row, mingling flowers with the

green, when desired, till the design is completed. Care must be taken to place the sprigs in such a position that the surface presents an even and slightly convex appearance. To effect this it is best to use the Lycopodiums in pieces about 2 inches in length, and to place but few in each row.

For some floral designs, the Everlasting flowers alone are needed. This is the case with the French memorial wreaths and crosses, which are made entirely of Gnaphaliums. Adopting the French familiar name, we call the flowers Immortelles; but they are the same with our common Life Everlasting, that abounds in rocky pastures and along country roadsides. Antennaria and Filago, branches of the same family, flourish in meadows and sterile fields. The most beautiful of these are, Antennaria margaritacea, the Pearly Everlasting; Filago germanica, the Cotton Rose; and Gnaphalium decurrens, White Life Everlasting. These all bear transplanting to the garden when in bloom, and if allowed to remain till the autumn winds scatter the seeds, multiply abundantly.

The flowers should be gathered in August —just before they are fully expanded—by cutting the stalks of the plants 2 or 3 inches below each cluster of blossoms. Then, to dry them: knot them, 3 or 4 inches apart, head downward, along a strong cord, and hang this cord across a dark closed room. The cup-like form of the pretty rose-shaped flowers is thus preserved, and also their pearly whiteness. In a week or ten days

Fig. 1.

Fig. 2.

they will be perfectly dry, and ready to shut away from the dust and dampness, in some tight box or basket till wanted. Proceed in the same manner when gathering and dry-

any species of Everlasting flowers, or their buds, and they will be of proper shape and colour, and retain their beauty for years. When used, their stems, being naturally too flexible to manage easily, must be strengthened by binding to broomstraws, or small sticks, or wires, with a strip of soft paper or a thread. If the flowers are to be taken singly, the clusters should be divided, and each individual stem improved in this way.

So prevalent is the custom becoming of

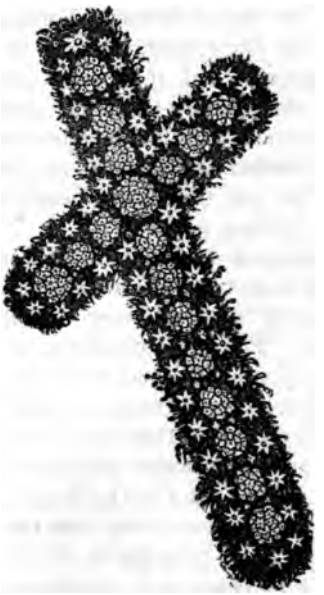


Fig. 3.

decorating graves with memorial emblems, made mostly or entirely of Immortelles, that large quantities of the dried blossoms are imported, and can be purchased of any seedsman. They can be had in their natural hue —white, or dyed black, lavender, purple, pink, green, orange, or yellow—for they readily take any common dye.

The forms for making crosses, and other designs of Immortelles, are usually of wire-work, convex, or plano-convex, in the interstices of which the stems of the flowers are placed, the whole presenting an even surface. Sometimes two or more colours are used in the same form, being arranged to suit the fancy, in bands, rings, spirals, or any other shape—as shewn in fig. 1, of a white

cross, having a smaller one of black in its centre. Fig. 2 shews also similar arrangement. On some forms, letters, monograms, or other designs are made of silver paper, and so constructed as to rise above the flowers, appearing as if embossed thereon. All of these designs may be purchased of the principal seedsmen. The designs illustrated are furnished by Messrs Dick Radclyffe & Co., Holborn. Any person can easily fill them.

tion. Gather and dry the same as the Acrocliniums. It is a very desirable plant.

These species of Everlastings are excellent flowers to use with Immortelles in the fabrication of designs presenting a flat surface, as shewn in fig. 3. A design of this sort is a fine ornament for the parlour wall, or for the church at Christmas, or for a burial-place at any season. If it is intended for out-of-door use, the frame should be of wood, and the surface exposed to view, covered with

Fig. 4.

Acrocliniums—A. roseum, A. album, and A. atro-roseum, producing respectively, dark pink, white, and light pink blossoms, are very pretty for the garden, or for winter wreaths or bouquets. Plant the seed in May; buds will be seen in August. These are to be gathered and dried before fully expanded, and in the manner directed above for all Everlastings.

Ammobium alatum — the winged-stalked Ammobium of New South Wales, grown in gardens, needs good soil and a sunny situa-

Lycopodium, or the bright green Wood-moss; the French moss, dried, and dyed a brilliant green, may be bought. The Lycopodium for this purpose should be of the most delicate sort—just its tips about 1 inch in length—and this, or the moss glued to the wood; then Immortelles in clusters, cut from their stalk and glued among the evergreens or moss; and Acrocliniums and Ammobiums the same, as represented in fig. 3. The bits of Lycopodium should be overlaid neatly.

When such a design is intended for indoor decoration, or can be kept from dampness, the Evergreen, or moss and flowers can be pasted or gummed to the frame, which will be sufficiently substantial cut from book or box board. Any design requiring great precision and neatness of workmanship, as the anchor, fig. 4—the emblem of Hope—the beauty of which depends greatly upon the nicety with which its points are finished, is most properly made of box board, and pasted or sewed, the flowers being Immortelles, both separate and clustered; Ammobiums and Acrocliniums, buds and blossoms.

Gomphrena globosa, the old-fashioned Globe Amaranth, is as good and as pretty as it ever was for the garden, as a window plant —growing all winter if taken within doors before the frost comes, and not kept too warm—or as a dried flower for bouquets, garlands, and other embellishments. Complaint is often made that Gomphrena seeds do not germinate. This is because of their cotton-like envelope, from which they should be set free. The best way to do this is to open each envelope with the point of a fine needle. The seed then drops out, and should be laid on warm mellow soil, a little soil sifted upon it and plenty of sun given it. If started in window boxes, these Amaranths gain time for abundance of bloom. This should be done early in spring, and the young Gomphrenas transplanted to a garden bed in May. Set them 1 foot apart. Gomphrena globosa rubra, with deep crimson flowers is the most common, and a fine variety. G. g. alba, pure white, is very handsome; also G. aurea superba, with orange yellow flowers. But the white should be planted some distance—several yards—from the crimson or the orange, or its blossoms will get discoloured and dingy. The blush-coloured and red and white variegated are sometimes clear and distinct, but cannot be depended on.

The Gomphrenas, especially G. globosa rubra, form an elegant contrast with clusters of Immortelles in Christmas or in memorial wreaths. The accompanying engravings shew how they should be disposed among the greenery. The flowers, however, may be either bound in with the Lycopodium, or, after the frame is finished in evergreen, sewed among the sprigs. Letters, monograms and long garlands, or "festooning," are made in the same way, for church or parlour walls.—*Anne G. Hole.*

NEW AND RARE PLANTS.

CYPRIPEDIUM HOOKERÆ.

THE Lady Hooker Cypripedium is a Bornean introduction. It is more remarkable for the beauty of its leaves than it is for that of its flowers. When in a good state of cultivation, the leaves are beautifully flaked and specked with white and green of a variety of shades. As an ornamental-leaved plant, we would place it next to, if not side by side, with C. Dayanum. Our engraving, fig. 2, gives a very good idea of how the leaves are mottled, only they grow to a much larger size than is here portrayed. No collection, however choice, can be without a Lady's Slipper of this kind, that fairly rivals these beautifully reticulated Anœctochiluses. It grows, too, quite freely in the ordinary stove temperature provided for plants requiring a moist, mild growing atmosphere at all times. Whenever it is stinted in respect of moisture, it shews a disposition to rust. The leaves interrupted in the process of absorption refuse to remain in a normal state or beauty, and become, as it were, rusted over with a ferrugineous coating. This is not only detrimental to the appearance of the plant, but affects its health and growing or increasing powers. The best preventive is a moving atmosphere, plentifully supplied with moisture. During winter, moisture must be withheld in

degree, owing to the deficiency of light, but not to the extent some people think. Artificial heat is at all times inimical in degree to health. The main difficulty the grower has to contend with and counteract or modify, is the arid, or approaching to arid, character of the atmosphere. Proper supplies of moisture are in demand, and the hitting upon the point—nice it may be—between extremes of moisture and drought shews the intelligence

The flower is produced on a tolerably long scape or foot-stalk, generally solitary, occasionally in pairs. The sepals are pale greenish yellow, with a more decided green in the middle. The petals, which are nearly twice as long as the sepals, are greenish at the base and up the middle, the remainder delicate purplish carmine, which runs in streaks of the same colour up the back, and appears on the front in rows of spots of the same colour at the centre of the petal. The labellum is greenish purple, shaded deeper in some sorts than others, and the pouch is often more inflated than the specimen shewn in our engraving, fig. 1.

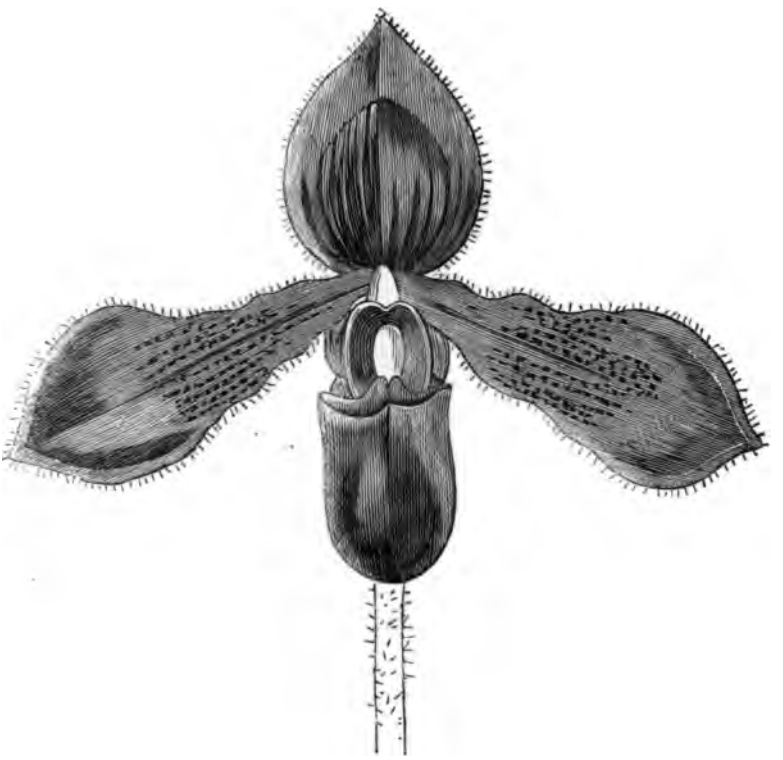


Fig. 1.—Cypripedium Hookeræ.

and cultural capacity of those to whom collections are entrusted. It may be well to state that no Cypripedium of exotic character cares much for a position far from the light. This one will shew its appreciation of attention on the part of the custodier in this respect, by increased beauty of blendings of colour, and general healthfulness, all other little things in the shape of pabulum, meat and drink, being duly attended to.

CAMPANULA ROTUNDIFOLIA.

Campanulas have been at all times favourite flowers. The colours of most of them are captivating, and the flowers are so formed

as to please the eye of the looker-on, as well as of those who go about with the scissors to cull a bouquet. We intend to refer to some of the more showy of them in future numbers of this journal.

Meantime, we give a set of three forms, all of beauty of outline and of colour, of the common round-leaved Harebell (Campanula rotundifolia). Of all the curious sports with which gardeners have lately made us familiar in the shape of double flowers, none have struck us more than these varieties (two of them not much dissimilar) of the plant which we believe to be the true "Bluebell of Scotland," notwithstanding that some hold a different opinion, and would carry the distinction elsewhere.

All the varieties are well figured in the "Gartenflora," from which we have taken the liberty to copy our engravings (figs. 3, 4, and 5).

Fig. 5 (p. 419) is the most remarkable. It is a double Harebell, with the corolla cut up into a multitude of long thin strips, or slips, having quite the effect of a Soldanella, whence it has been named Campanula rotundifolia Soldanelliflora, fl. pleno. Figs. 3 and 4 represent the other variety, which has the corolla cut up and multiplied into numerous reflexed petals in the form of a small garden Ranunculus, and it has been named Campanula rotundifolia Ranunculiflora, fl. pleno.

These have all been raised by Messrs

Fig. 2.—Cypripedium Hookeræ—shewing how the leaves are mottled.

& J. Gotthold & Co., of Arnstadt, from
ı of the double Campanula rotundifolia,
ch is usually known in gardens by the
ıe of C. rhombifolia, fl. pleno. They are
ennials, and perfectly hardy, and are said
lower most freely, growing 1 foot or 1½
high.

Fig. 3.—Campanula rotundifolia Ranunculiflora, fl. pl.

EUCHARIS AMAZONICA.

have been growing this Amazonian Lily
two years, and have had a wonderful
cess. Like my sisters in success, I am
ud of it, and I wish to tell the readers
this Magazine how I Manage to grow
flower this most beautiful of Lilies. I
have had it for bouquets for my hair, and
have had plants too, quite recently, for dinner
table decoration, and in each case my Lily
has been rewarded with the admiration of
many observers. Its beautifully white flowers,
with the richly toned yellow and green cups,
upon which the stamens are placed, render it
one of the most captivating of flowers. I only
wish I could have it about Christmas, and I
am trying all I can, in the hope that I shall be
rewarded then, as I have been rewarded all
along, with success.

Well, last season I had two plants which
grew in my greenhouse; one of them flowered

last September, and to suppress the gratification I felt would be difficult on seeing its great white flowers expand. I had only one spike, or scape, which I believe to be the proper definition, and on that scape there were three flowers; not a great number certainly, but sufficient to enlist my sympathies, to awaken my zeal, and command afterwards my very best attention. My brother George, who has no *penchant* for flowers at all, and who sometimes, if not altogether, expresses wonder at the time I waste upon what he calls that precious greenhouse and planthouse of Eucharis flowers. The way I do is, I keep some of them in my stove and some of them in my greenhouse, and the difference in temperature, together with the facility which these plants grow in plenty of pot room, seem to have the effect of throwing them into a state of flower. When my March blooming plant was out of flower (it had two spikes, one five-flowered and one four-flowered), I thought it might be a good plan to give it a rest, so I set it out-of-doors, along with another one that had not flowered at all, and imagine my agreeable surprise to see them growing into spikes of

Fig. 4.—Campanula rotundifolia Ranunculiflora, fl. pl. See page 416.

his sister Margaret, altered his tone a little on seeing the Eucharis; and now, like myself, he is all anxiety to have Eucharis flowers, because a certain friend of his, in whom he seems more than ordinarily interested, expressed her admiration on receiving a bouquet in which this flower formed a conspicuous part. He, in fact, bought three more plants, and entrusted the management chiefly to me. Well, this season we shall have five plants. I have scarcely been a month since February without flower. Both plants seem to have enjoyed the variety of climate, and shewn their appreciation of it as we all do when we go a-coasting, for such benefits as bracing the nerves, and increasing the vivacity, and putting on health. Now, if my sister readers would try the Eucharis as I have done, they will have flowers, that not even those choice and beautiful and expensive Orchids can excel for purity, for substance, or even for a bride's bouquet. I am not a great authority in

I leave the getting of them, and the and the potting, too—although I see it according to my mind—to Telford, a handy jobbing man he is too, and one so indulgent as to give way in the matter of what some others might call "professional experience," to an humble aspirant of horticulture, such as is your obliged reader—*Margaret B.*

Fig. 5.—Campanula rotundifolia Soldanelliflora, fl. pl. See page 416.

Work in the Garden during December.

From "THE VILLA GARDENER."

THE VINERY.

BALD and bare, waiting for the pruning knife, is an epitome of the state of the cool vinery at the end of the year. Most of the leaves will have fallen, and those that remain have ceased to perform any useful function. The sere and yellow leaf point to a time of rest, when the vital forces of the plant mostly sink down towards the roots, as hybernating animals slink away to their sleeping places in the cold season. The tide of life has reached its ebb, and now is the time to regulate its area, and circumscribe its force for the next season. This is done by pruning. It is said that a donkey was the first pruner. If so, it was assuredly the wisest lesson ever taught by him, or any of his innumerable relations among the superior animals. But learned how, when, or where, it may, it is undoubtedly one of the most important operations within the entire range of horticultural practice. Like most good things, it has been terribly abused. Set a beggar on horseback, and everybody knows where he will be found at the end of his journey. Put a knife into the hands of many, and they make war to the death on the poor passive trees or plants. However, the age of slashing has well nigh passed. It has been succeeded by judicious pruning, and very often injudicious pinching. What the rack and thumb-screw were to our martyred fathers, pinching incessant, hobby-horse pinching, is to our sorely tried trees. That pruning of some sort is indispensable, no plant affords stronger proof than the Vine. Left alone in a year or two, it would become a tangled mass, and either kill itself with fruit-bearing, or yield us a crop of Grapes, fashioned after the size of the tinniest Peas. The growth it makes is enormous, and pruning is needed to keep the plant within bounds, and concentrate its vital and fruit-bearing force into a comparatively few fine fruit rather than diffuse it through many worthless ones.

So much as to the necessity : now for the mode or manner of pruning. For many years there have been but three general types or systems of pruning the Grape Vine, though each of these has branched off into endless varieties. These are the spur, short-rod, and long-rod methods. It may be stated here that the training of the Vine precedes all the modes of pruning. The whole of them are based upon the assumption that the growth of the Vine has been directed into one or several leading shoots, as they are termed. Left to itself, the Vine would grow into a tangled faggot of wood, interlaced in all directions. Every bud would break into a branch, and grow perhaps one, perhaps twenty, or more bunches. Hence this disbudding or stopping, that is, removing all buds not meant for fruit, and the stopping of all young shoots not wanted for growing wood. This stopping and training in one season prepares the way for the pruning of the ripe wood of the next. It has, in fact, given us something definite and substantial to prune. A leading shoot or Vine-rod, we will suppose, has run to the top of the house. This should be left the full length, or shortened back half way, according to their strength. This rod is the foundation of the spurring system, and those who adhere most closely to that system mostly prefer to have it formed in one season, and tied in as straight as an arrow. It is then disbudded, that is, every alternate bud removed, and sometimes two taken, to one left. Of course, all the buds left will break into branches, and, if strong, bear fruit. Judgment is needed to suit the burden to the back of the Vine, and the lighter crop the first season, the better for the future health and prosperity of the Vines. But, heavy or light, or if no fruit has been taken, a branch has sprung out from each bud, which has probably been kept by stopping within 4 inches or 1 foot of the main rod. The side branches are called spurs, and the time for cutting them back has come. Some cut them clean off back to the rod, others leave one, two, or more eyes. The surest mode for a crop is to leave an eye or two, and, according to the number of eyes left, the terms, long and short spur-pruning are applied to it. Close pruning consists in cutting them clean off.

The short-rod system—this is sometimes grafted on the spur system, thus :—Each alternate shoot on the rod is allowed to bear fruit; the other, wood only. At pruning time, each bearing branch is cut clean out, and the wood shoot shortened back to the best bud. The next season this bears fruit, and the closely pruned fruit branch of the previous season grows wood for the next year's crop, and so on, year by year.

But, generally, the short-rod system consists in having three or more shoots running up the Vinery in succession, one after the other. The first season, one rod is taken up, a second shoot is afterwards taken from its base. At the winter pruning, the primary shoot is shortened back to within say 4 feet of its fruit-bearing portion, and the top of the second rod is cut off at the lower end of the older rod. The

of the spurs that bore fruit on the first rod are
it off clean, and not permitted to grow any
the second shoot furnishing the lower portion
liage and fruit. Next season there is a further
on and a new rod. In three or four years the
s filled. After the system is thoroughly estab-
a rod is cut out, and a fresh one laid in each

The whole of the fruit in this mode of prun-
produced on the young wood, and the system
size of bunch. The constant succession of
is young shoots, likewise keeps the energies of
nt awake, and the system is a sure cropping

long-rod system is more simple still. No Vine-
ars but once on this plan. The whole of the
are produced on the young wood. During
mmer, a second shoot is taken up to succeed
e that has fruited. As soon as the fruit is ripe,
uring rod is cut back to its base. From these
ring one or two shoots, one of which is allowed
t the next season, and the other is cut clean

On this system, a growing and fruiting shoot
ays grown in company. One shoot in harness
the second preparing to succeed it. Strictly
out, no rod bears a second crop. But often
ctice the long system becomes a compromise
n the short rod and the spurring plan. Indeed,
in narrow houses, it is not always practicable
rods of sufficient length and strength to carry
om bottom to top of the house. Hence, often
rod is bared of spurs to within a few feet of the
d the remaining portion is permitted to fruit,
ish the upper part of the rafters. This system
me advantages. Such large annual growths of
stir up and keep active the vital force of the
and produce a new crop of roots annually.

for a regular crop of moderate sized bunches and
of fine size and high flavour, perhaps there is no
method of pruning than moderately close spur-

As to the act of pruning, though so many
urs stumble and fail over it, few things are more
. A quick eye, a sharp knife, and confidence,
e chief qualifications. The first shews where to
confidence supplies nerve ; and the knife, sharp
rmly grasped, does the work in a business-like
er, that is, clean, not too near the bud, and at a
angle of at least 45 deg.

soon as the pruning is completed, clear away the
, retaining the best eyes for increase if wanted.
dress the Vines with a mixture thus compound-
Take of sulphur and cow dung, or clay, equal
and make them into a thick paint with tobacco
and cover the Vines with it. If it does not do
good, it does no harm, and some propound it as
ect preventive of thrip, red spiders, &c.

he vinery is empty, a few degrees of frost will
no harm. But nothing beyond 5 or 10 deg.
l be permitted, and they are safer without it.
rm comes to the Vines by storing plants in the
in winter, if the temperature is not permitted to
exceed 40 deg. This temperature will have no ex-
citing effect upon late Vines.

THE ORCHARD HOUSE.

We have little to add to the instructions of last month. See that the aphides are thoroughly destroyed. Though not generally recognized, it is nevertheless, a fact that they are more injurious on dormant wood than in the growing season. Now, they bore into the bark, and eat out the tender hearts of the fruit buds. Gishurst's Compound, at the rate of 4 oz. to the gallon, applied with a sponge or a brush, is a good remedy. Many also dress after pruning, with some such mixture as that prescribed for Vines.

The winter pruning of the orchard house is generally a very simple affair. Any shoots of young wood that seem disproportionately long may be shortened. From 9 to 18 inches are useful limits of length for these young shoots. In addition to this, any dead spurs, or small branchlets, or crowded, misshapen, cankered branches should be removed. In shortening back the shoots, it is best to cut to a wood bud. These are thin and long, and easily distinguished from the plump, prominent, fruit buds. On many shoots, however, none of these single wood buds will be found. In that case, see that one of the trio of buds that you shorten to is a wood bud.

Now is also the month for root pruning, root covering, and root nourishing. Trees that have an excess of strength must have the root power reduced by pruning. Those that shew signs of exhaustion should have their roots stimulated by fresh supplies of earth, composts, or, even in rare cases, of manures. Keep sharp frost, and the equally sharp bills of the birds, and teeth of the rats and mice, from your trees for the winter.

THE GLASS HOUSE.

December is an improvement upon November in this department. The transitional period is passed, and we begin to settle down into wintry ways. Doubtless, too, as winter creeps over the outside world, and strips it more and more bare day by day, we are more grateful for the symbols of life and freshness that are wakening up within. Besides, the glass house has more beauty, and that of a more inspiring type in December than in November. Chrysanthemums still, in many cases, continue gay, and Camellias, Azaleas, Epacris, Heaths, and Primroses, throw a spring-like beauty over all else. But all this supposes that the house is chiefly devoted to flowering plants. But many glass houses are mere store houses for bedding stuff, or furnished with pot Pelargoniums, Fuchsias, &c. With such furniture, there will be little or no flower. Still, the inmates of such houses are enjoyable. To carry their occupants safely through, keep the temperature at 40 deg., and beware of damp settling on the foliage. Give air every day in mild weather ; water early in the morning ; mop up all water on floor or path, or, better still, do not spill any, and keep all scrupulously

clean. Place a few pots of Violets, Snowdrops, Crocuses, Tulips, Mignonette, Lily of the Valley, and the early Forget-me-not, M. dissitiflora, in prominent positions. The sight of the advancing growths inspires hope, and anticipates spring tide amid the gloom and frosts of winter.

PITS AND FRAMES.

Hot Pits.—Keep up the temperature to 60 deg. Hot linings, fire heat, and covering will be needed. A few more Hyacinths, Narcissus, Lily of the Valley, Crocuses, Tulips, Roses, Deutzias, and Lilacs, might be brought on in these; or a fresh batch of Rhubarb, Seakale, Asparagus, &c., may be introduced. It is difficult work to preserve stove plants in pits or frames in winter. But such things as Euphorbia Jacquiniflora, Poinsettia, Begonias, and even Marantas, and other things, may be grown and flowered in them. The temperature should not fall below 60 deg. nor exceed 70 deg.

Cold Pits and Frames.—Exclude the frost. The temperature should not fall below 40 deg. If Pelargoniums, show, fancy, and variegated, are stored in these, from 45 deg. to 50 deg. will suit them better. Neither is this too high for Radishes and Potatoes and Cinerarias. On the contrary, it is hardly possible to keep Pinks, Carnations, Auriculas, Polyanthuses, Calceolarias, &c., too cool. From 32 deg. to 35 deg. will not be too low for such plants. Cool and dry are the best recipes for successful storing; but the latter must not be carried to excess. Root drought, moreover, destroys many plants. Water seldom, but thoroughly, when the plant is really dry.

THE FLOWER GARDEN.

Unless cropped with winter and spring flowers, see that every inch of it is turned up rough to the pulverizing and enriching influences of the atmosphere. When filled with such things, run a hoe through among them occasionally. This will not only ameliorate, but keep the roots warm. One of the best protectors against frost is a layer of loose and dry earth on the surface.

This is the season for ground-work—trenching, draining, manuring, levelling, turfing, &c. All these changes should be completed with the year, if possible. The new year brings its full share of work, and should never be burdened with arrears from the old.

Complete the cleaning of shrubberies; when properly managed, but little cleaning will be required. These ought to flow over on to the turf, and to be so thickly massed that all leaves that fall among them should be left for the nourishment of the roots, without being seen. Roses and briars for budding may yet be planted. The former should likewise be protected. The roots, with a layer of long dung; the top with a handful of dry Fern fronds, as previously described. Choice beds of Tulips and other bulbs should be protected with mats, or other means, from the frost. A layer of coco-fibre refuse, dry sawdust, or spent tan, from 6 to 9 inches thick, forms one of the best protections. Of course it must be removed before the bulbs grow into it. Sweep and roll the grass and walks clean, or, better still, sprinkle the walks with a dusting of bright gravel, and roll down hard. Nothing brightens up a place in winter so surely as such top-dressings. The gravel and labour cost but little, and never were pleasure and enjoyability purchased so cheaply.

THE FRUIT GARDEN.

Finish the planting of all fruit trees and bushes as soon as possible. Stake and mulch as soon as planted. Weeks, months, a season, may be lost by frost laying hold of newly-moved roots. They are abnormally active, and consequently abnormally sensitive. Therefore guard them from the cold.

Prune the hardiest of the trees and bushes. If small fruit are pruned now, dust the bushes over behind the pruner, when they are damp, with dry soot-lime, or guano. The dusting should be repeated during the winter, this spoils the buds for the birds.

Let the training and the pruning of Cherry and Plum-trees on walls proceed, at every opportunity, in mild weather. The sooner this work is completed the better, and the weather is frequently more favourable now than in spring. It is needless to caution the villa gardener against training or nailing their trees with fingers so cold and numb as hardly to know whether the hammer hits the nail or the fingers. Take time by the forelock, and pick the sunshine out of winter for this cold work, and time will be found for it. Pretty full instructions will be found in THE VILLA GARDENER as to the best mode of training. The chief point, after all, is to prune and train so as to cover the wall and ensure a crop.

Raspberries, Strawberries, Gooseberries, Currants, should now be top-dressed, leaving the manure on the surface till the spring, or pointing it in at once. The heavier and richer these top-dressings, the better the crop, and higher the quality by-and-by.

Look over the fruit stores every week, and remove every specked fruit before it has time to rot and infect others.

THE KITCHEN GARDEN.

Radical cultivation should be the work of the month, and, if possible, be completed within it. By this we mean the manuring, digging, trenching, mixing and drainage of soils. The cold acts as a spur to the performance of such heavy works as these. They are easier done, and consequently better done in winter; and the earlier the better, not only for economy, but efficiency. Kitchen garden soils can hardly be trenched too often. It changes the soil even if nothing is added to it, and a change of root run is most valuable to the plants. The depth should likewise be increased at each trenching, at least till a maximum

lepth of from 4 to 5 feet has been reached. These leep-feeding grounds are highly prized by the roots .t all seasons: but during a dry time they are invalu-.ble. When all other sources of moisture fails, it is ound in plenty, deeper down in these lower cisterns of he earth. Trenching enlarges the root area without he expense of buying more land; and the roots, if onsulted, would prefer these new runs beneath them, ather than on one side. Surface-rooting is favourable o the fruitfulness of fruit trees; but that is no reason vhy we should encourage it in our vegetables. On he contrary, with most of the latter, the deeper the oots bore, the faster and larger they grow, and the ›etter the quality.

The Crops require attention even in winter. Last vinter tried and killed most of the Broccoli. It would ›e well worth the labour of a slight covering in severe veather. Nothing is so good for this purpose as a hin layer of dry straw or fern. Very little suffices; ›ut during severe frost, the covering, thick or thin, should be shaken up afresh daily. The action of rost is cumulative and progressive. It travels in traight lines, and, unless interrupted in its course, vill begin its piercing work to-morrow where it left off to-day; hence the importance of breaking up its passage-way by a daily change of position and of surface in our covering materials. The same rule holds good in regard to our coverings over glass, handlights, cloches, protectors, pits, frames, and houses. A change of front on these almost equals in protective force—an addition of fresh material.

Earth up Celery, protect the crown of the ridges from rain, and store a week or a fortnight's supply, as wanted. Look over Walchern and other early Broccoli daily, and pull up or cut all that are nearly fit, storing them also in cellars, sheds, &c. The same course should be taken with Lettuses, Endive, Horse Radish, &c. Place a few yards of Rendle's protectors over a nice row of Parsley, and cut fresh and tender therefrom for garnishing, all the winter. Consolidate the ground around young Cabbages, winter Spinach and Onions.

Guard the early Peas sown last month from mice and rats; and should they not come up nicely, sow again in the same manner as recommended last month. See that no weeds are to be seen during the winter, and that neither dirt nor decaying leaf nor neglect, with its woe-begone looks, disfigures the kitchen garden in the dead season.

Arboriculture.

THE CULTIVATION OF TREES.

THE cultivation of trees of a deciduous character is again occupying the attention of the arboriculturist. When the pigmy forms of vegetation are so alluring, so captivating as to engage the attention and command the interest of the thousands, need the naturalist but wonder that the giants of our landscape do not command a more extended suffrage? Thousands of pounds are spent every year for what one might call the ornamental subjects of a day, while a mere tithe of that amount judiciously expended would create such a diversified display that would increase in beauty and effect year by year. Judging from that point of view, we have apt illustration of the selfishness of mankind; we plant by ourselves for ourselves, in order to reap a full crop of enjoyment, trusting that posterity will be animated by the same feelings, and we live quite contentedly to enjoy in a measure the work of our own hands. But the threescore and ten years allotted for the lifetime of mankind is comparatively a short period in the life of certain of our deciduous trees, and therefore, if we plant only to please ourselves and expect posterity to do the same, the chances would be that many of the giants of the forest would be pressed out of existence altogether; and, indeed, but for the commercial importance of some of them, they would run a very narrow escape. The taste for a knowledge of horticultural and botanical science is decidedly on the increase, but it evidently runs in stated directions. Fashion is as dominant in horticulture as it is in other things, and the majority of the people are gregarious in their habits. Not that all follow after the same branch of even the same science; but there is a prevailing fashion in the particular branch, and the majority go by that. Take, for instance, the modern fashion of what is called Bedding-out, and how few, how very few, were strong-minded enough to stick to the old plan of having an extensive assortment of species ranged together, to yield a varied supply of flowers throughout the season! Not that bedding-out is not right and proper, and is not a step in advance of olden practice, but there is a limit to its kingdom. There is, indeed, a limit to the kingdom of tree, and shrub, and ornamental tenderling. Whenever the one trespasses upon the dominion of another, the individual ought to be treated as an aggressor and forcibly removed. We never can expect to get the finite minds of men—"wonderfully and fearfully made," to come to common terms of agreement upon even the small matter of landscape formation and decoration; all that we can do is to endeavour "to educate a party," by pointing out what appears to us to be overdone, and what, if done at all, is only done imperfectly. We desire that no department, either in connexion with horticulture or arboriculture, should be neglected. If the science and art is to flourish "like the green bay tree," none of its departments can afford to be in a nugatory state; and it is because there is a certain lukewarmness conspicuous in the matter of deciduous trees in particular, that we endeavour to press their claims for consideration, not only on those who have been studying arboriculture, but on all who have grounds to ornament, be they extensive or be they limited.

Of course, we do not require to point out that no habitation of man is complete without trees. Thousands, millions, there are of houses reared and piled together, tenement after tenement in endless variety, and thousands and millions there will be in all time

coming, without much of tree life to adorn or soften their hard lines; but that is a necessity of a commercial population. Glad are we that Nature is so bountiful, and that in the abundance of her subjects there are many that are proof against the host of contending influences that war against their well-doing. If the city dweller, whose ground sells by the square yard, cannot have trees to look out upon, he can at least have his window flowers, at no additional expense for the space they occupy; and much pleasure and delight are reaped from this source of enjoyment alone. But, oh, what a thrill of pleasure pervades his whole soul when he is in a measure let loose among glorious country scenery, where the well-furnished woods shew him the giants of the vegetable kingdom in all their woodland glory! Even now the russety hue that adorns the landscape, varied in its tints, and beautiful in its blendings, not yet robbed entirely of its summer garniture, not yet divested of that interest which rouses the feeling of the landscape artist to a high pitch, and nerves his hand to the brush that is in so many touches to reproduce it upon canvas, is full of interest greater than any artificial combination which the gardening artist can create, with all the portable material he can command, for an October or November display. The chill breath of frost has done its work among the gay flowers of the parterre, and even where it was not present, the long cold dewy nights have washed the colour out of every flower. Summer gardening indeed is gone, and there is bleakness and bareness athwart the earth, which even evergreens and parti-coloured foliage cannot sufficiently atone for. The woods even in their *deshabile* constitute the only feature that awakens admiration; and when you can view them from the valley beneath, mayhap where the broad river runs in pellucid streams, "where swan and shadow move together," and where the whole amphitheatre of foliage from the banks on either side are reflected in its waters, one might well become a convert, if never before, to Sylva and Sylva's subjects, and embrace every opportunity of extending her kingdom and strengthening her reign.

The glories of the autumn woodland are yearly increasing. The dozens of species of certain genera have been multiplied nearly by their own numbers, and we have such an array, if we would only use it, as would heighten the effect of any landscape immensely. The poet, just exactly a century ago, truly described the woodlands of that day in the following glowing terms; and if we were true to ourselves, and looked not less, we shall say, to our enjoyment, but looked forward a little more to the enjoyment of posterity, we should be the creators of such landscapes as could not even be eclipsed in either oriental or occidental habitats.

Cowper says:—

"Here the grey smooth trunks
Of Ash, or Lime, or Beech, distinctly shine
Within the twilight of their distant shades;
There, lost behind a rising ground, the wood
Seems sunk, and shortened to its topmost boughs.
No tree in all the grove but has its charms,
Though each its hue peculiar; paler some,
And of a wannish grey; the Willow such,
And Poplar, that with silver lines his leaf,
And Ash far stretching his unbrageous arms;
Of deeper green the Elm; and deeper still,
Lord of the woods, the long surviving Oak.
Some glossy-leaved and shining in the sun,
The Maple and the Beech of oily nuts
Prolific, and the Lime at dewy eve
Diffusing odours; nor unnoted pass
The Sycamore, capricious in attire,
Now green, now tawny, and ere autumn yet
Have changed the woods in scarlet honours bright."

Following Cowper, and what of the Ash of the present day? Not much, says the general planter, following the views of another poet, who speaks despairingly of it—"the Ash for nothing ill"—and yet as a landscape tree the additions that have been made to the common grey smooth trunked one (Fraxinus excelsior) render it a most marked subject. To say little or nothing of the ordinary pendulous habited one (F. excelsior pendula), which is about the purest formal weeping tree planted, and one of the most eligible for small gardens, for arbours, and for individualizing in certain nooks, we have the golden-barked weeper (F. excelsior aurea pendula)—a grand winter tree, conspicuous in the distance for its shaded golden

bark, and beautiful, too, at all seasons. The ordinary golden form (F. excelsior aurea) may be distinguished by its twisted branches, indeed, there are one or two forms of it that are well worthy of the attention of planters of deciduous trees. Then, again, there is the yellow blotched variety with broadleaves (F. aucubæfolia), not unlike an Aucuba in its blotching, and highly ornamental. There are other forms, but we name these as the most conspicuous for strengthening the effect of our normal landscapes, and the best too for all gardeners.

The Lime, too, with its "grey smooth trunk," best abused of trees, but, notwithstanding all that, indispensable in any catalogue of trees. No more perfect specimen habit could be desired than this European species (Tilia europæa), that dispenses its odours "in dewy eve." It is a little early in the season in dispensing, too, with its foliage, which tells against it; for falling leaves are an eyesore to those who are orderly in their ways; but to our thinking the golden tint that it puts on in August enhances the appearance of the mixed landscape, and is rather an acquisition than a drawback. What an admission! And yet there are some grounds for it when we cater so anxiously for variety of shade in everything in connexion with decorative effect. Were it for nothing else than introducing the Weeping Lime (T. alba pendula) into this notice, we should be doing our readers good service. The weeping form that we refer to is not the American, but the European species. and is characterized by its oblong-cordate leaves, more oblong indeed, than any of the family. What, however, gives importance to it is the white surface underneath. This silvery or hoary surface, when the tree is moved by the wind, is an object of great attraction, and particularly so throughout the summer. As an individual plant, we would recommend the weeping form of European Lime (Tilia europæa alba). The American Limes are very distinct, and make noble trees, particularly the Mississippi Lime (T. mississippiensis), which forms a noble tree, with great cordate leaves of a silky sur-
e.

The third of our grey smooth trunked trees named by Cowper is what Spenser calls the "warlike Beech" (Fagus sylvatica) — one of the grandest of trees for a landscape, stately and tree-like, and in great variety. No one walking in a wood, or along an avenue where Nature had reared these venerable columns, but felt, if his thoughts were disposed on reflection on the standing examples of centuries, a thrill of admiration better imagined than described. In the peculiar stillness which prevails in a calm evening, one could well understand why Keats described in his thoughtfulness the "melancholy boughs amidst which there ever sound which seems like silence." We have now an assortment of varieties of the European Beech which forms not the least attractive among the novelties that have been presented in commerce. Many, indeed, take to the Purple Beech that take to few other novelties in trees. It is quite as well known, we may imagine, as Mrs Pollock Pelargonium, or Snow in Summer, or Purple King Verbena, and we might also add that it is got up at a tithe of the expense, and improves in appearance at a cost of *nil* every year. You have to propagate your Mrs Pollocks and your Purple Kings, and keep them over and tend them with a certain carefulness eight months out of twelve before you count much upon effect. You have even to do a good deal in the way of dividing up and replanting slips of your Cerastium; but plant the Purple Beech in any ordinary soil, in any ordinary position, and it will live, and grow, and enjoy life. It seems somewhat anomalous, and even spiteful, to draw a comparison of this kind, but when we see so many excellent things occasioning little first cost, little trouble afterwards, all but ignored, there is a necessity to bring the matter up, and shew it, or endeavour to shew it, in its proper bearings. Well, then, the Purple or Brown Beech (Fagus sylvatica purpurea) is a most excellent subject for any kind of decoration, be it for the forest to enliven the general tints, be it for the woods, where a little more is seen of the hands of the arboriculturist, or be it for the pleasure grounds, or for park, or parterre

decoration. We never seem tired of it, and it grows so well. Now, that is a first plant to be marked in the catalogue of villa gardeners and of all kinds of gardeners, and we trust that it will be, in the interests not of ourselves, but of our readers, and of horticulture. Next in importance we would class the Weeping Beech (F. sylvatica pendula) which is a grand subject for park decoration, and for such scenery where the natural and picturesque is preferred to the geometric and gardenesque. It is of irregular flowing habits, now seen with its long branches bare above, from the weight of the laterals drooping downwards, again in the profusion of its umbrageous laterals sweeping the lawn in most elegant style. No weeping form of tree is equal to this for giving general satisfaction to the lovers and admirers of Nature. Then the cut-leaved form (F. s. heterophylla) is so elegant as to commend itself to planters in general. It is one of those trees that bear individual investigation well. The two others above named are splendid object trees in the distance, but this is one that any villa gardener might walk round and admire, and walk round and round again. The same may be said of several forms having leaves cut less or more—the fern-leaved for example (F. s. asplenifolia), and the crested (F. s. cristata), which is peculiar, and looks more like a malformation than a true variety of the Wood Beech. The American Beech (F. ferruginea) is distinct and good for general woodlands, the greatest gain being the broad-leaved ferrugineous sort (F. f. latifolia) which is not unlike the Chestnut, and which may be with the greatest safety introduced by all who may go to market, either for the clothing of the park or the pleasure-ground.

The Veterinarian.

POISONING OF PIGS WITH COMMON SALT.

PROFESSOR CAMERON writes as follows upon this subject:—

The following case of pigs poisoned with common salt is, I think, not devoid of interest:—On the night of 7th October 1871, a train arrived at the terminus of the Liffey branch of the Midland Great Western Railway. In it was a consignment of sixty-two pigs, contained in two waggons. In one of the waggons, thirty-one of the pigs arrived perfectly safe and in good condition; but, in the next waggon, the pigs (thirty-one in number) were found, without an exception, in so very sickly a condition, that the consignee would not receive them. The fact of diseased pigs being at the railway station was communicated to the municipal sanitary authorities, and I inspected the animals early on the 8th October. Before my arrival, four of the pigs had died, and sixteen had been killed whilst apparently dying. Eleven were still alive, but they appeared to be not far from death. On examining the carcasses of several of the pigs, I could not perceive any symptoms of the ordinary diseases which affect those animals and it at once occurred to me that they had been poisoned. On closely examining the waggon in which they had been conveyed, I found nothing of a poisonous nature; but quite casually I happened to observe a few grains of a white powder on one of the hinges of the door, and this, on examination, proved to be common salt. The idea at once occurred to me that the pigs had been poisoned with common salt; and subsequent inquiry elicited the fact that the animals had been conveyed in a waggon which had previously been laden with salt. It would appear that the pigs had been for many hours without any liquid, and that they licked up the salt when on the floor of the waggon. The surviving pigs I ordered to be given emetics, stimulants, and abundance of warm water, and they all revived under that treatment.

On making an examination of the carcasses, I found general, but by no means severe, signs of gastro-intestinal inflammation. A teaspoonful of the semi-liquid contents of the stomach of one pig contained about 3 grains of common salt; but there was not much food in the stomachs. The brain was greatly congested, and there was considerable extravasation of blood in the cerebellum and medulla-oblongata.

I have not the slightest doubt but that the death of these pigs was the result of the action of common salt upon their economus. The chemical analysis of their viscera proved the absence of ordinary poisons, and the animals had certainly not died from any of the usual diseases to which pigs are liable. I am quite satisfied, then, that salt was the cause of death; but I am not so certain as to the *modus operandi* of the poison. The inflammation of the digestive canal was hardly sufficient to cause death; and it seems strange that the chief effect of the poison should be observed in the brain. If the salt had acted as a simple irritant poison, we might naturally expect to find the evidence of its action more palpable in the digestive organs than in the brain. As the animals, no doubt, had been thirsty, and their mouths parched, might it not have happened that the salt which they had licked induced a spasm of the glottis, and brought on apnæea? When I first saw the pigs, my impression was that they were in a state of asphyxia, and I in-

l whether or not they had been con- in a close waggon. I found, however, ne pigs had not been over-crowded, and he waggon was almost without a roof. I d observe that I found a little salt in ostrils of one of the pigs.

is is not the first case of poisoning with ion salt: Dr Taylor mentions cases of n beings who lost their lives from the f an excessive quantity of salt. About ears ago, a case where eight pigs were ned by getting too much salt on their came under my own observation. In *eterinarian* for 1855, a case of "poison- pigs with common salt" is reported by Robinson, of Tamworth; and in the *inarian* for December 1862, Mr H. , M.R.C.V.S., of Nottingham, describes ier case of the kind. He states that several pigs, which were receiving about 4½ ounces of salt per day in their food, died, and that he "felt perfectly satisfied that all the mischief had arisen from the quantity of salt the pigs were eating." On discontinuing the use of the salt, the pigs that had not died, but were sickly, soon recovered.

I often hear of pigs dying suddenly without exhibiting the symptoms of the ordinary maladies. Occasionally, the viscera of such animals are submitted to me for analysis, but the presence of ordinary poisons in them is the exception, and not the rule. In future, when such cases come under my notice, I certainly shall determine the amount of the salt present in the stomach; for it may be that death from over quantities of salt results far more frequently than we have hitherto been led to believe was the case.

CURE FOR RED SOLDIER IN PIGS.

WE copy the following from the *Irish Sportsman and Farmer*:—I see a in your most useful journal respecting ed soldier disease of pigs, which is a fatal complaint; very few get over it at nd those that do are generally not worth ig, as no mortal man or woman could them more than half fat, no matter you gave them. I lost several fine pigs ie complaint the summer before last, ch I bled them—not by opening a vein, u recommended, but by docking them. off their tails to within 1 inch of the , and let it bleed out, which is more e and better than opening a vein. I ler where a farmer is to be found able to a vein, and stop it at pleasure; but ugh bleeding is certainly of service in ing the animal, there is little chance ring them unless the bowels were purged, hat is the difficulty. To give castor oil osom salts to a pig is both difficult and erous; the half of it is lost or spilled in operation, and then it does no good; besides, the exhaustion produced in the animal by his resistance and the use of his lungs does him much harm. Now I have, I may say accidentally, discovered a way of getting their bowels relaxed without all this trouble—viz., by the jappa physic, or tasteless purging powder, which is given to horses that are hard to ball; and for one of that sort I got the powder from Dr Whitney, of New Ross. In a few days after, I had a nine-months-old boar pig taken with the soldier regularly enlisted, and of my own accord I tried this tasteless physic, and with perfect success. I took a-fifth part of the small powder and mixed it in a wine glass-full of new milk, and had not then the smallest trouble in administering it with a table-spoon. I then docked the pig, and kept him moving about slowly for half an hour. After four hours, the bowels were slightly operated on, and I then gave him another fifth of the medicine, which scoured him effectually, indeed, too much, for I had to give him flour and milk to check. He drank this eagerly,

and in three days he was ravenous with hunger, and the disease completely subdued. I kept the animal half-starved for a fortnight, and he is now as fine a pig, as far as condition goes, as there is in the county of Wexford. About a fortnight since, a neighbour had three that took it, and two of them got well by jappa physic. The one that perished, I think, was choked, as it was very roughly handled.

DISEASE AMONG LAMBS.

THERE is nothing novel about the disease which has recently destroyed large numbers of lambs in various parts of the country. On the contrary, says the *Field*, it has long been known, particularly in the west of England, as a fatal malady which every season inflicts more or less damage on the flock. Numerous essays have been written and pamphlets have been published on the subject for the information of farmers; but, whether the fault lies in the character of the writings on the minds of the readers, it is quite certain that the knowledge of the nature of the affection is still confined to the few who have made the disease a special subject of inquiry. At agricultural meetings, certain undoubted facts are adduced by practical men, and conclusions are drawn which, to say the best of them, are entirely inconsequent to the points at issue; for example, it is said that the disease arises when animals are fed on rank old pastures, that roots are injurious, that the weakly animals are most liable to be attacked—all of which statements are in some degree true, while they have nothing to do with the actual cause of the malady. Lung disease of lambs and sheep depends on the presence of small white thread worms (Strongylus filariæ). These parasites, when fully grown, are about 2 inches in length, and of the thickness of a piece of coarse stocking cotton; therefore they are easily detected in the windpipe and bronchial tubes, the minute ramifications of which are sometimes completely choked by them. They also occupy the larynx and cavities of the nostrils, and are often expelled from these positions by the act of coughing or sneezing. Parasites of all kinds are fond of locating themselves in young animals in preference to the adult; why, it is difficult to say, unless we accept the orthodox but feeble reason that they find in the young organism the conditions which are favourable to their development.

Of the fact that young subjects are the favoured hosts or parasites no question can arise; and it is also patent that the imperfectly developed organism is incapable of resisting their attack. Hence the popular notion that weakly animals are more prone to parasitic invasion than healthy ones.

Symptoms of the lung disease of lambs are usually well marked. The worms act injuriously in two ways: first, they occasion by their presence a constant irritation of the mucous membrane, which is indicated by a frequent and harassing cough; next, they cause an increased secretion of viscid mucous, in which they collect themselves in masses, and block up the finer bronchial tubes, thus inducing partial suffocation by preventing the proper supply of air being carried to the blood-vessels which ramify over the air cells. The combined effects of constant irritation and imperfect respiration soon become manifest; the diseased animals fall away in condition until they are little more than skin and bone, and, lastly, die from extreme exhaustion. Frequently, cough and emaciation are the prominent symptoms of this parasitic disease—not necessarily characteristic, but always suggestive—quite sufficient to shew the necessity for a minute investigation, which shall determine the nature of the affections. Probably, before

estion as to the causes of the
of the lambs occurs, some of them
ave succumbed to the disease;
the destruction of one of the
the flock for *post mortem* examina-
ll not be a serious consideration.
he dissection of a lamb be from any
convenient or impossible, a microsco-
mination of the mucous which flows
nostrils may suffice; if the eggs
oryos of the worm are found in that
e evidence of parasitic disease is posi-
it the absence of eggs and embryos
onclusive of the absence of the para-
the bronchial tubes. The examina-
he nasal mucous, therefore, is a pre-
step which is worth the trouble of
on account of the evidence which it
nish; but the examiner must beware
ing positive conclusions from nega-
emises. A *post mortem* inspection
been determined on, it is to be pre-
that a professional man will conduct
, as it is constantly objected that no
ary surgeon is within reach, the direc-
hich are subjoined are intended for
dance of the shepherd or the farmer.
move the lungs with the windpipe at-
then slit open the windpipe and fol-
ne of its branches into the lungs. In
ases, if the worms are present, they
at once seen, in bunches like tangled
of cotton, in the windpipe and small
f the lungs. But it is very necessary
d a positive conclusion here again from
ence of parasites. The worms, after
orary residence, quit the bronchial
some of them penetrate the minute
res of the lungs, and the remainder are
away through the mouth and nostrils
ith the mucous in which they live, and,
in the pastures, become the means of
ng future flocks. After the worms
ft their habitat in the bronchial tubes,
a and young worms will be found in
cous; and therefore a minute examina-
the lungs and bronchial tubes is always
ary when the adult worms are not
ered.

stomach and intestines should always be cut open throughout, in order to ascertain if any other kinds of parasites are present. A variety of Strongylus often infest the fourth stomach of sheep and lambs, and does more mischief than the parasites in the lungs.

Treatment.—What the flockmaster wants is a specific—some fluid, gaseous or otherwise—which will cure; this is the universal demand, which, oddly enough, takes precedence of the inquiry as to means of prevention. Many remedies there are of more or less potency, but no specific has yet been discovered, nor is likely to be. Given that the worms are in our reach, we can kill them; but, unfortunately, in their sheltered position, they defy all means which are not sufficiently powerful to kill their host also. The most obvious course is to keep the flock in such condition, that the animal attacked will have a fair chance of withstanding the effects of the parasites; as the weakly lambs quickly die, it is important to have as few of these as possible. A proper system of feeding and general good management, the details of which the farmer perfectly understands, will do more to lessen the mortality than all the specifics which are advertised.

When lambs are folded on damp, cold ground, exposed to wind and rain, and half starved on poor grasses or such watery food as swedes or turnips, it is not remarkable that a large per-centage are unable to bear up against any debilitating influence. Of the various remedies used, turpentine takes a high place; it is a powerful worm killer, and it is so penetrating that it quickly finds its way into the circulation, and is exhaled or excreted from mucous surfaces generally; 1 drachm of the agent, with the yolks of two eggs or 1 ounce of glycerine, may be given to each lamb once or twice a-day, where the number is so small as to allow of this mode of treatment. Fumigation with the vapour of carbolic acid, chlorine, or sulphurous acid gas may be tried; but these processes can only be carried out by a competent veterinary surgeon, amateur experiments in this direction being often very disastrous in their results. Quicklime is recommended by some persons who

have tried it, as a harmless and effective remedy. The method of using it is simple enough; the floor of a shed is covered with the lime in coarse powder, and the diseased animals are driven about every day. Some of the dust of the lime is inhaled, and is thus brought in contact with the worms.

All methods of treatment will fail when the animals have been neglected at the onset, and have become exhausted; therefore it is that we insist so strongly upon the importance of a liberal system of feeding, as well as the utmost care in the management of the flock.

MURRAIN IN FARM ANIMALS.

By Mr J. Robertson.*

MURRAIN, or foot-and-mouth disease, is said to be an irruptive fever, and, as you all know, affects principally the feet and mouths of those animals subject to its influence. It is well known to be most contagious and infectious; and, as a proof of the latter, I may mention one instance which came under my own observation a good many years ago, where the virus was carried from one lot of cattle, freshly brought into the district and infected with the disease, to another, by a storm of wind and rain, which carried it over a tall thick hedge, across the public road, over a 6-feet high wall, and then across a plantation of large trees, and hedge, and ditch, of altogether at least 150 lineal yards. Of this, there could be no doubt, because until the arrival of the infected lot of cattle in question from Ballinasloe fair, there was no foot-and-mouth disease in the district; and as neither animals nor any human being could possibly have crossed the intervening hedges and high wall from the infected to the non-infected herd, so as to be the medium of carrying the disease from one lot of cattle to the other, there was no reason to doubt but that the disease had been carried through the agency of atmospheric influences. The present season, too, has given many proofs of the extremely infectious nature of the disease, and we have seen, notwithstanding the restrictions of the Government, on every side, and generally throughout the Empire, the disease spreading just as if no restrictions had been attempted. Murrain cannot be called a dangerous disease, as the instances are few where death results from it, especially where the animals affected are simply either let alone altogether, or, at most, food supplied in a form to enable the suffering beast to pick it up without any strain upon the muscles of the mouth. But, notwithstanding its course is thus moderate, it is marked with serious deterioration in point of condition of fat or half-fat stock, and besides, is often the precursor of pleuro-pneumonia. When the mouth or palate is much excoriated, cabbage leaves, cut clover, soft hay, or cut turnips, and, above all, mashes of bran and a supply of oatmeal gruel gently horned down the throat of the animal in extreme cases, is nearly all the treatment that is required; and if the mouth in such cases is dressed, say twice a-day, with a wash composed of 1 ounce powdered alum, 1 ounce powdered catechu, and 1 ounce bole armenian dissolved in 1 quart of tepid water, to be gently applied by a soft piece of calico tied to the end of a stick, the sores will heal all the sooner, and the beast be enabled the quicker to return to its natural way of feeding. Sheep, although also seized in the mouth, seldom give over feeding, and in their case the feet are the most affected. The feet, in cases of lameness, whether in cattle or sheep,

* Read before the Athy Farmers' Club.

should not be treated until fever and inflammation have abated, and even then mild caustics should be preferred for dressing with, to a more severe application. In many cases, foot-and-mouth disease is the precursor of the much more serious distemper, pleuro-pneumonia; and as a preventative of this, cattle newly out of the former ailment may be advantageously given tonic medicine for a time. Perhaps the most useful for this purpose would be sulphate of iron dissolved in warm water and hored down, say three times a-day. Pigs, in my experience, get over murrain easier than either cattle or sheep, especially where properly attended to, and carefully fed while under the disease, with luke-warm sloppy food, and kept comfortable in respect to litter and shelter. Murrain has prevailed periodically since its first introduction in these kingdoms; and at the present time, in the very face of the powers given to the Irish Executive to deal with it effectually, it is, perhaps, more wide-spread than on any previous occasion. This, I think, is most unsatisfactory, and shews either the inutility of these powers, or the incapacity of the authorities who are expected to put them properly into operation. One thing at all events is clear, from recent experience of the measures taken by the Irish Government in reference to this disease, and that is, that "meddling and muddling" is not the way to go to work in trying to arrest its course. And yet, we may ask, what other means have been adopted by Professor Ferguson, Earl Spencer, and the Irish Privy Council up to this moment in regard to the disease? There was a time when foot-and-mouth distemper had only a few centres in the country, and when it had not as yet assumed the epidemic form; and what, under these circumstances, and with the very full powers given them by Act of Parliament, did Professor Ferguson, Earl Spencer, and the Privy Council do to arrest its course? Absolutely nothing, but fulminate ukases and proclamations, and threaten fines upon the stock and flock-owners of Ireland! They had the power to enforce the cleansing of railway waggons and pens, and yards at railway stations, but up to the present time that power has not been properly exercised. The railways are just now as fruitful in spreading cattle disease as they ever were. The Government could have put a cordon of soldiers round the first centres of foot-and-mouth disease, and thus have effectually "stamped it out," but they did not make the attempt! They preferred apparently to imitate the English Government when first rinderpest appeared in Britain. In that case, as is well known, rinderpest could have been surrounded and "stamped out" in its first outbreaks, but the Government then, as if paralyzed, allowed it to spread until it had carried ruin and destruction throughout the herds and flocks of the kingdom. Still it is questionable, if, even then, those who insist on all occasions upon their exclusive right and ability to govern us, could have successfully coped with the disease, but for the example shewn them by the farmers of Aberdeenshire in Scotland. Until that example was shewn, our legislators could only think of slaughtering herds and flocks without compensating the owners, and in this way committing a public wrong, because they could think of no other way of managing.

The Dairy and Poultry-Yard.

POULTRY FARMING WITH PROFIT.

WE have often urged upon farmers the necessity of paying more attention to poultry as a branch of live farm stock than they at present do. The enormous imports of eggs we annually receive from foreign parts, and the high price at which they are sold, prove conclusively that there is a large field open for the rearing of poultry at home. We are quite aware that many good farmers, and housewives fond of their flower gardens, consider domesticated winged creatures a nuisance about the homestead; the one believing there is little profit to be reaped from their keeping—that they pick the wheat and steal the barley; and the other that they scratch out and destroy the tender and beautiful plants. Where care is taken, however, and regular feeding looked strictly after, it has been found that neither objection holds good, that poultry will respect the corn-stacks, and yield a profit, and eschew the garden after a little breaking-in. Hens are very tractable after a little training. As sheep learn to know the voice of the shepherd, so do fowls learn to recognize the voice of their mistress—guinea fowls, perhaps, being the most inapt scholars, as, like John Grumley's hens, in the old Scotch song, they have a knack of frequently laying away.

A correspondent of a contemporary has given us a balance-sheet for about nine months, from October 8, 1870, to June 30, 1871, for fifteen hens and nine ducks, which shews a profit of £3, 14s. 7d. on an outlay for food of £5, 18s. 4d. The details are:—

RECEIPTS ENDING JUNE 30, 1871.

Eggs used in house 795, and for setting purposes 124, together 919, at 1d. per egg...	£3	16	7
Eggs sold, 290 at 2d. each	2	8	4
ive cockerels killed for house	0	15	0
Two cockerels killed and sold...	0	7	0
Forty-six chickens in yard, at 1s.	2	6	0
	£9	12	11

EXPENSES ENDING JUNE 30, 1871.

Food	£5	18	4
Profit	3	14	7
	£9	12	11

This balance sheet, favourable as it is in shewing the profitable nature of poultry, does not appear to us to bring out to its full extent the value of the birds. For instance, it charges only 1d. for each egg used in the house; whereas for selling purposes, it marks down those sold out at 2d. each. Now, if the eggs brought 2d. a-piece in the open market, it is fair to presume that a like price would have had to be paid for those used in the correspondent's house had he been obliged to purchase them. Looking at the matter in this light, therefore, the 919 eggs ought to be doubled in value, which would give an increase of £3, 16s. 7d. to the profit-side of the balance sheet. Sixpence per head should be added to the price of the five cockerels stewed or roasted at home, in order to make their value tally with that of those sold. This gives an additional 2s. 6d., which, added to the £3, 16s. 7d., makes the amount of profit beyond that set down £3, 19s. 1d. Looked at in this light, therefore, which we think is a fair enough one, the total sum in profit realized from the fifteen hens and nine ducks is £7, 13s. 8d. From this would fall to be deducted the interest on the original price of the birds, but this would be trifling.

The correspondent, who signs himself "C. C.," gives some interesting details with reference to his management which cannot fail to be read with interest. His observations about feeding, breeding, and housing, can be followed with advantage by all who desire to raise eggs for the breakfast, and chickens for the dinner tables.

Food used—corn, barley, and maize, mixed in equal proportions, and ground oats; soft food—

potatoes mixed with sharps. They have an unlimited grass run; soil, sandy loam. Casualties—Brahma cock killed by a stone; one chicken killed by cat. Breeds kept—Eleven Dorking hens, two Minorca hens, two Brahma hens, one Minorca cock, and one Brahma cock.

The Brahma cockerel was only twelve months old when killed by accident, but the eggs laid by the hens produced the large proportion of nine cockerels out of fourteen chickens. I should never keep so young a bird again for breeding purposes, being convinced that with young hens you should have a two or three-year-old cock to produce a large proportion of pullets.

Eighty-six eggs were fertile out of 124; several of the remainder contained dead chickens. My first chickens were hatched March 23; my last (of the 124 eggs) in July.

My advice is to get the chickens out as early in February as possible, giving them eggs and milk cooked as custard (for which I am indebted to a recipe in your columns), with rice four times a-day (for the first month); they then have ground oats, potatoes, and sharps, and at six weeks take their chance with the other fowls.

The Dorking hens are very indifferent layers—eggs, too, are small; and I think the hens are too heavy for hatching purposes. The Minorcas lay capitally, and very large eggs; they have not sat. But commend me to the Brahmas; their eggs are large, they lay almost as frequently as the Minorcas, and their chickens are as hardy as possible. I have only lost one. The chickens from the cross with the Dorking hens are excellent for table purposes, and I have sold them at 4s. each, unfatted, average weight 3 lb. 10 oz., sixteen weeks old.

I have over fifty pullets to begin this coming winter with. My March birds are shewing for laying. I hope to give them good warm roosts, with liberal and stimulating food. I trust to be able to send you a better balance-sheet some other day, as I am convinced that fowls may be profitably kept if you have a well-selected stock to start with, and if you will but look after them as carefully as you do after farming stock generally.

We trust other correspondents who have experimented with poultry, and kept records of their cost and returns, will furnish us with the results, as we are quite convinced, along with the writer of the above communication, that fowls can be profitably kept if stock be well-selected at the beginning, and if the poultry receive the same amount of careful attention that is usually bestowed upon the live-stock on the other farm.

The Apiarian.

BEE FARMING IN 1871.

MR A. PETTIGREW, Rusholme, Manchester, has communicated the following letter to the *Times*:—

The letter on this subject for 1870, which you kindly inserted in your columns, was extensively copied by the provincial press of this country, and actually appeared in the Australian newspapers. I believe it did more to awaken attention to the subject of bee culture than the *Handy Book of Bees*, and all other treatises besides, have done. My little cottage for weeks was flooded with letters of inquiry from clergymen, chaplains, officers in the army and navy, farmers, station-masters, ladies interested in the welfare of cottages, and working men. One letter from a poor labourer in Suffolk, who has been toiling all his life long for 10s. a-week, pleased me more than all the rest, for he seemed greatly pleased with the idea of increasing his income by bee keeping, and thus saving himself and wife from the painful anticipation of shortly becoming dependent on and a burden to the parish. Who would not take pleasure in lending help to put such as he in possession of the power and "privilege of being independent?" I had hoped that the balance-sheet this year would be a good one, and be a great stimulus in turning the attention of working men in country towns and rural districts to the art of bee keeping, for I still hold that a few hives of bees, properly managed, would be to them a boon of greater value than a row of cottages *à la* Peabody. Who can accurately estimate the value of the bee-pasture of Great Britain and Ireland? I would much like to see a fair trial between agriculture and apiculture—say, between the farmer and his labourer. And if any farmer, amateur or practical, will pit 5 of his best acres, cultured to the highest degree, against ten hives of bees, I will accept the challenge, and put down the hives on any spot that can be found between Manchester and Knutsford. No trial could be much more interesting than this, or likely to lead to happier results. Of course, the trial would last three years to cover a rotation of crops by the farmer, and give the bees a chance of getting a favourable year for gathering honey.

The present year has been one of the most unfavourable in Lancashire and Cheshire for honey that we have had for eight or ten years. Last winter and spring were severe and protracted. Even in May, gentlemen had to wear their overcoats. July, usually the best for honey, was very unfavourable, raining almost every day. In these northern parts, the human body yielded but little sweat, and flowers but little honey. I am not aware that a dog of any kind was ever seen panting in Lancashire this year. The last few days in August were the most favourable for honey gathering. About 200 lb. of honey would be collected daily then by the bees, turning the scale in my favour. It will be remembered by some that the profits last autumn were £58, leaving a possession of forty-five hives as stock. The income this year from the sales of honey and honeycomb, swarms, and hives of bees, with increase of stock, is £72. Expenses are unusually heavy. New hives and boards, £9; rent, £5, 5s.; carriage, £5, 15s.; feeding, £3, 5s.; felt for covers, £1; sundries and gratuities, £5—altogether, £29, 5s., leaving a profit of £42, 15s.

Three or four swarms only became fugitive, and were lost for want of time to hive them. Eight or ten young queens were lost on their marriage tours and never returned to their

hives. Though it is not my business to touch on the history of bees here, I may be permitted to say that queen bees become marriageable when they are a few days old, and invariably leave their hives to find mates. If they remain too long in the fields, the bees at home become very uneasy and excited; and if the queens do not return consternation and collapse occur in their communities. Unfortunately, most of the hives that thus lost their queens were at a distance, so that the loss was not discovered till it was too late to find queens for the hives that lost theirs.

Parties seeking information will excuse me for letting them know that I have no time to answer letters of inquiry. The *Handy Book of Bees* was written for the benefit of the ignorant, and as the copyright of this work was sold three years before I found time to write it, the reader will see that I have no interest or profit from the sale of the book thus recommended.

The Naturalist.

INSECTS INJURIOUS TO VEGETATION.

[Concluded from page 284.]

IN the great section of the Lepidoptera are placed all those different species in which the antennæ is never terminated in a club, as in the preceding group, the Butterflies. In the species composing this group, the antennæ are filiform, fusiform- or setaceous; the males in many species having them beautifully pectinated. There are not less than nineteen hundred British species known, and the number of exotic species is probably equal to that of any group in the entire order of insects. The insects of the family of Sphingidæ are the most robust and powerful of the whole group. They are known in this country as the Hawk-moths. The tongue in many species is very long, being adapted for reaching the bottom of the longest tubed flowers. They are called Sphingidæ, from the circumstance of their larva assuming a position, when alarmed, resembling the figure of the emblematic Egyptian sphinx. Many of the species only take wing in the evening about twilight; others fly by day, as does the Humming-bird Hawk-moth — so called from its flight and mode of hovering on the wing, after the manner of the Humming-bird, whilst it quaffs the nectar of flowers.

The Sphinx convolvuli takes wing in the evening, not flying, but darting like a flash of lightning from flower to flower; its tongue, which is longer than its body, reaching the bottom of the longest-tubed flower.

One of the best known and most universally distributed species of Sphingidæ is Acherontia atropos (the Death's-head moth), so called from the pale skull-shaped spot on its thorax, which has caused its appearance to be regarded with dread by the superstitious. This moth sometimes commits depredations on the stores of the hive bee, a fact well known to apiarians.

All the species of this family are beautiful insects, being, as it were, painted in the richest and most harmonious colours. Some of the British species are of great rarity, as S. Pinastri and Deilephila Euphorbiæ.

The family Ægeridæ contains the moths known as Clear-wings.

The family Bombycidæ contains the silk-producing species; the best known, and that which produces the most valuable kind, being the Bombyx mori, the common silkworm being the larva of that species. Many other moths belonging to this family are silk-producers, particularly those belonging to the genus Attacus. To this genus belong some of the largest moths, popularly known as Atlas moths, and one of these is now being domesticated in Algeria and Brazil in the same way as the common silk-worm. This species is the Attacus Cynthia. It feeds on the Castor-oil plant.

The "Procession moth" is worthy of notice. It is a common species in Germany (Cnethocampa processionea). On its larva the fine beetle, Colosoma sycophanta, feeds. To this family also belongs the great Goat-moth, so destructive to Willow and Elm trees. Zeuzera Æsculi is also a destructive insect in the larva state, to Elm, Horse-Chestnut, Pear, and Apple trees.

The family of Psychidæ are case-making moths. The females are wingless, the legs, antennæ, and organs of the mouth, being almost entirely obliterated. A few small species are found in this country. One, Oiketicus nigricans, occurs in the New

st. They are found attached to the
h and Gorse in May, when the moth
ars.

me of the Australian cane makers are of
ge size. The case formed by the larva of
ticus Saundersii is grey, of a silky texture,
trengthened or protected by the addition
ces of stick. At the lower end is a flexible
ure, through which the excrement is
arged. Through a tube at the upper
the larva comes out to feed. These
are attached to various shrubs. Similar
are found in South Africa.

ie generations of the female Psychidæ
been observed to succeed each other
ut the production of or access to the
ed male, through seven successive years.
ee Siebold on Parthenogenesis.)

ie family of Noctuidæ is the most ex-
ve of all the families of Lepidoptera, and
belongs the bulk of the night-flying
s, and they are consequently aptly
d Noctuidæ. In this country alone up-
s of three hundred species are found.
prevailing colours of our indigenous
es are sombre brown, black, grey, or
intermixed occasionally with dull reds.
of the exotic species are much more
y coloured. In this family the body is
t; the antennæ are usually simple; the
vings are narrow, under which the hind
are folded in repose; the larvæ are
ly naked, have sixteen legs, and undergo
transformation under ground. To this
y belongs the common Yellow Under-
(Triphæna pronuba), so frequent in
ns, in Strawberry beds, &c. Some
es are, however, very local, as Agrotis
era from the Isle of Wight, A. Ashwor-
om North Wales, and others we have
ace to enumerate.

e Pyralidæ is an extensive family, if we
le the exotic species, but of very
rate extent in this country. The Sarro-
is cribralis is a remarkable species. It
has been named Four-foot moth from its curiously hairy fore legs.

A species of this family indigenous to Jamaica (Diatræa sacchari) is very injurious to the sugar cane. It is a pale yellow dotted moth. Its larva destroys whole acres of cane in dry seasons, by boring into the stems of the canes.

The family of Tortricidæ is so called from the habit the caterpillars have of twisting up leaves so as to conceal themselves. There are nearly three hundred species in this country. They are usually small dull-coloured moths, and when at rest somewhat resemble a bell in shape. A species of this family (Carpocapsa pomonello), the Apple moth, is one of the most destructive enemies to the Apple crop. The eggs are laid in the newly-formed fruit, within which the larva feeds, and all that are thus attacked fall prematurely to the ground. The Plum, Apricot, and other fruit trees, suffer from the attacks of species belonging to this family.

The family of Geometridæ is equally extensive with the Noctuidæ, but in this country probably not quite so numerous. The caterpillars are called loopers, or geometricians, whence the family name. They are rather slender bodied, but their wings are ample. Their larvæ have only ten legs. Their mode of progression is very peculiar; having no legs in the middle of the body, they attach themselves firmly with their fore legs, and then bring up their hind legs close to them, thus curving or looping the body in the form of the Greek letter Ω. The caterpillars feed on the leaves of various plants, and, when disturbed, drop down swinging by a thread, up which, when their alarm is past, they remount. In some few species the females are quite, or nearly destitute of wings, and would never be taken for moths by non-entomological persons. Some species do great damage to fruit trees; others to forest timber.

The Country Gentlewoman.

THE PARLOUR GARDENER.

CHAPTER X.

THE GARDEN UPON THE LARGE BALCONY.

The Terrace Balcony—Boxes to furnish it—Running Shrubs: Glycine (Wisteria), Virginia Creeper, Buddlea, Clianthus (Crimson-glory Pea)—Assorted Plants—Seedling Ranunculus—Manner of assorting the Shades—Use made of the Plants propagated in the Portable Greenhouse: Pinks, Hyacinths, Tulips, Crocuses, Pelargoniums, Chrysanthemums, Fuchsias, Lantanas, Heliotropes, Mignonette—Utility of this last—Winter Dress of the Terrace Balcony—Galanthus (Snowdrop)—Japan Quince—Hellebore—Christmas Rose—Variegated Holly.

HAPPY the person who, in the interior of any large city, possesses a large balcony with an exposure ever so little to the south. It is almost equal to the possession of a garden.

THE TERRACE BALCONY.

We may consider as garden terraces those long and wide balconies extending, if not all along the front of the house, at least for a sufficient distance to admit of our gardening there in a far less confined space than in the mere verandah of a window. Access to such balconies being had through windows reaching down to the floor, before each window an interval should be reserved, to allow you to approach the balustrade, and lean on your elbows whilst looking out. Should it be your good fortune to occupy a home rendered at once healthy and agreeable by such an appendage as a spacious balcony with a good exposure, the side spaces, intermediate to those kept open in front of the windows, may be supplied with wooden boxes longer than they are wide, painted a dull red or maroon, and filled with good garden earth, mixed with manure. You have but to consider these boxes as the borders of a parterre, and proceed to garden there accordingly, as you would on the ground.

PLANTS FOR THE BALCONY—WISTERIA AND VIRGINIA CREEPER.

At each end of the balcony, a box (its length equal to the width of the balcony), which two boxes have a special destination: it is there that you must plant a Glycine or Wisteria, and a Bignonia, or Virginia Creeper—the running stems of which are to be trained parallel to each other along the balustrade. Thus, without encumbering the balcony, you will have, in the spring, the beautiful bunches of amethyst flowers of the Wisteria, hanging gracefully outside, and shedding an odour the most delicately sweet of almost any of the whole vegetable kingdom; and in the autumn the Virginia Creeper, in bunches of a rich red, will renew the decoration. During the intermediate heats, the abundant foliage of these two plants will very advantageously protect the boxes of ornamental plants from the burning contact of the solar rays. You need not contrive any other shelter for them.

BUDDLEA AND CLIANTHUS.

To procure still more shade, add to the above a robust plant of Buddlea globosa on one side, and Clianthus Dampieri on the other.

The Buddlea, raised about 5 feet high, and left to itself from this height, will fall in all directions, with as much grace as do the flexible branches of the Weeping Willow. At each extremity of the slender and supple branches will open a long bunch of flowers. Should it so happen that some of these flowered branches, in the exuberance of their

s, stray off so far as to pay a visit to next-door neighbours, they, especially : taking the air at their windows, will no cause to complain of the intrusion.

e Clianthus—to which you must give support, four rods of white osier tied ıer — will very soon hide this support · its abundant vegetation, adorned with usion of flowers of the finest carnation r.

these two shrubs occupied the middle : balcony, they would take up too much and prevent your seeing out; but placed e two angles, they give a little shade, and perfumed, which contributes to r more delightful still those moments of ay that one likes to pass, with book in upon the balcony in the midst or e flowers.

OTHER PLANTS.

e various ornamental plants of each sea- the principal of which I have indicated ı as being suitable for making a show : garden at the window, at the different ures—can, of course, be made use of in ating a balcony large enough to serve ırpose of a terrace.

SEEDLING RANUNCULUSES.

as I advised, you have amused your- n rearing in the cold portable green- of your parlour, a supply of young roots : Ranunculus obtained from seeds, you ıfter having used such of these little roots re requisite for the ornamenting of your -stand, have a considerable number ım left. In the spring, when you have ıger cause to dread the appearance of more lingering frosts, plant this resi- f those little roots in one of the boxes ur balcony. They will give you, for a ı's time, a profusion of flowers of varied s, some deep and lively, the others and delicate. The first year, these s will necessarily be mingled together zard. When you come to pull up the , after the bloom, you must observe the r of the flowers of each plant, and write colours in a list, with a number affixed to each colour. Prepare papers in which to wrap the roots, by marking each paper with one of the numbers on your list; and when you wrap up the roots, for putting by till the following spring, place all of the same colour and shade together in one paper, bearing the proper number. By this means, when they are to be planted the second year, you will be enabled to arrange the deep and light colours artistically. The deep colours are always the least numerous.

Observe, I beg of you, ladies, that if you take care of your Ranunculuses when in bloom, watering them at the proper times, and do not allow them to be wasted in bouquets by indiscreet visitors, the finest among them will give you a good supply of fertile seed. The plants that you will obtain by sowing these seeds will not reproduce exactly the colours of the parent flowers; but the choicest flowers, you will be sure to have a beautiful mixture, presenting the finest shades in proper proportions.

PLANTS PROPAGATED IN THE PORTABLE GREENHOUSE.

The boxes of the great balcony—I suppose them to be large enough—will naturally be the receptacle for the plants reared in your portable greenhouse; and among these will be your seedling Pinks, that will all find an appropriate place there. A group of variegated Tulips, another of Hyacinths, blue, rose, and pale yellow; elegant borders of Crocuses which you have taken care to alternate, white violet and golden yellow;—these will enamel your parterre from the very setting in of spring. Do not be afraid to multiply by cuts tings your Pelargoniums, Chrysanthemums- Fuchsias, Lantanas, and Heliotropes, in order, that your boxes may be kept constantly filled with plants in flower. You will never have too many, if you be sedulous not to leave empty places in them. With this view, be always careful to sow seeds in the place of the plants you have transplanted. You will be surprised to see how very large a quantity of plants a space apparently so small can hold, if you do what is requisite to make each one of your boxes

present constantly, from spring to autumn, a full bouquet, rich in its variety of colours and of perfumes. As regards perfume, sow Mignonette everywhere. It thrives in the shade of the other plants, takes up but little room, and keeps out of sight, its perfume only disclosing its presence; and provided that you take care not to let it exhaust itself in producing too many seeds (the production of seeds not being the business of your garden), it will continue to bloom until the end of October, holding on till after the first serious frost. The previous white frosts will then have already killed first the Balsams and the China Asters, then the Tagetes and the Ageratums of Mexico, afterwards the Petunias; the Chrysanthemums alone will remain. Then it is that you will congratulate yourself for having sown a great deal of Mignonette. So long as it continues to bloom it will contribute largely—now in a far larger proportion than before—to the pleasantness of the visits you will continue to pay, in November, to your balcony garden, on the few fine days which the departing year may yet have in store for you.

WINTER DRESS OF THE BALCONY GARDEN.

Winter is decidedly come. Your faithful little Mignonette, yielding at length to what the jurists call *force majeure*, has abandoned you and disappeared from your boxes; your Chrysanthemums have taken shelter within doors, that they may there continue to present you with flowers. Now, then, as they can no longer wear their summer garments, give to the borders of your balcony parterre their winter dress, which, though much les variegated, is far from being without charms. Plant there those beautiful tufts of the Galanthus, its white flowers bordered with green. Its common name, Snowdrop, may perhaps be more familiar to your ears; and this name its robust temperament fully justifies, for it is endowed with a most hardy constitution—one that enables it to bloom bravely between two frosts, so that when a pale ray of sunshine comes to melt a thick layer of snow, one is agreeably surprised to find the Snowdrop in full flower.

One or two plants of the Christmas Rose (Helleborus niger), two or three Hollies, with their variegated leaves, green and white, among which the fruit shines like coral beads, and an Aucuba or two—these will clothe your great balcony with attractions that may tempt you out there to inhale the wintry air, except on the worst days of this worst of the seasons. You will have received there, from autumn, the last of her flowers as a *souvenir* of past joys. You will now obtain there from her grim successor, 'a present, acceptable in itself, and yet more so as a harbinger of the coming spring.

And thus, ladies, the refined and refining pleasures which the practice of gardening affords will have been enjoyed by you, in all their variety, without your leaving the house.

Before leaving the subject of the balcony garden, I would strongly advise, before any plants are put into it, that a glass screen should be erected at each end, so as to keep off the wind. It might be constructed of rough plate glass; and if the screens were returned about 2 feet in front, they would be sll the more useful.

PARSNIPS AND SALSIFY, AND HOW TO COOK THEM.

THE Parsnip (Pastinaca sativa) is one of the most nutritious and wholesome of the edible roots. It can be eaten from November to May, but is in its best condition in the spring. It may be kept in the cellar if not allowed to wither, but it is best when permitted to remain in the open ground. With a litter or covering of some sort, this can also be done advantageously even in the north of Scotland. Much of the flavour and of the saccharine principle which in the spring is largely developed in this root, are lost in the ordinary method of cooking. We will try to avoid this loss.

STEWED PARSNIPS.

The Parsnip is an edible that imparts much of its sweetness and flavour to the water in which it is cooked, and when this is thrown away it is irretrievably lost, leaving the root comparatively flat and tasteless. But when these qualities are thus preserved and restored, any one eating the root so dressed for the first time will be surprised at its richness and flavour.

To prepare them for cooking, they can be scraped and sliced lengthwise, according to the common custom; but a much more expeditious, and in some respects a more tasteful method, is to wash and cut them across in slices of, say ⅓ inch thick, and then pare them. Then put them to stew, with water enough to cover them. Stew until perfectly tender—it may require three-fourths of an hour, and if you can so time it, have the water reduced to a thin syrup, being very careful not to scorch it. Simply dish these and pour the syrup over them, and you will have a most delicious dish without any further seasoning whatever.

If any are left, they can be eaten cold, or browned on a gridiron.

Another way is to add milk or cream to the syrup, thicken with flour, and pour over the dished Parsnips, and also add some bread dice if you like.

An excellent dish is made by cooking equal quantities of Parsnips and Onions together, stewing the latter at least an hour and a-quarter, then adding milk, and thickening with meal.

BAKED PARSNIPS.

Scrape off the skin smoothly from good sized Parsnips, and bake in a quick oven until perfectly tender and brown. It can be done in an hour, or even less, but the time required will depend on the heat of the fire and on the size of the roots. Parsnips can also be steamed to good advantage. Both of these methods preserve the sweetness of the roots, and the baking concentrates it.

SALSIFY, OR VEGETABLE OYSTER.

This plant, the botanical name of which is Tragopogon porrifolium, is also a wholesome and nutritious root, but much more delicate than the Parsnip. It is similar to the latter in its winter-keeping peculiarities and in its time of use, but it is not so sweet nor so large.

STEWED SALSIFY.

The roots should be washed and scraped, and washed again very thoroughly. In scraping, it is well to hold them in a cloth, or paper to prevent staining the hands with the juice, though this stain can be removed with pumice stone or lemon-juice. Halve them lengthwise, and stew with very little water until tender—say forty minutes—dish them, reduce the juice as much as possible, add cream, salt, and scald slightly; pour it over the Salsify. Serve warm. If cream or condensed milk cannot be had, add milk, and thicken with flour or wheat meal. Another way is to omit the milk, salt, and thicken entirely with cooked pearl barley or rice.

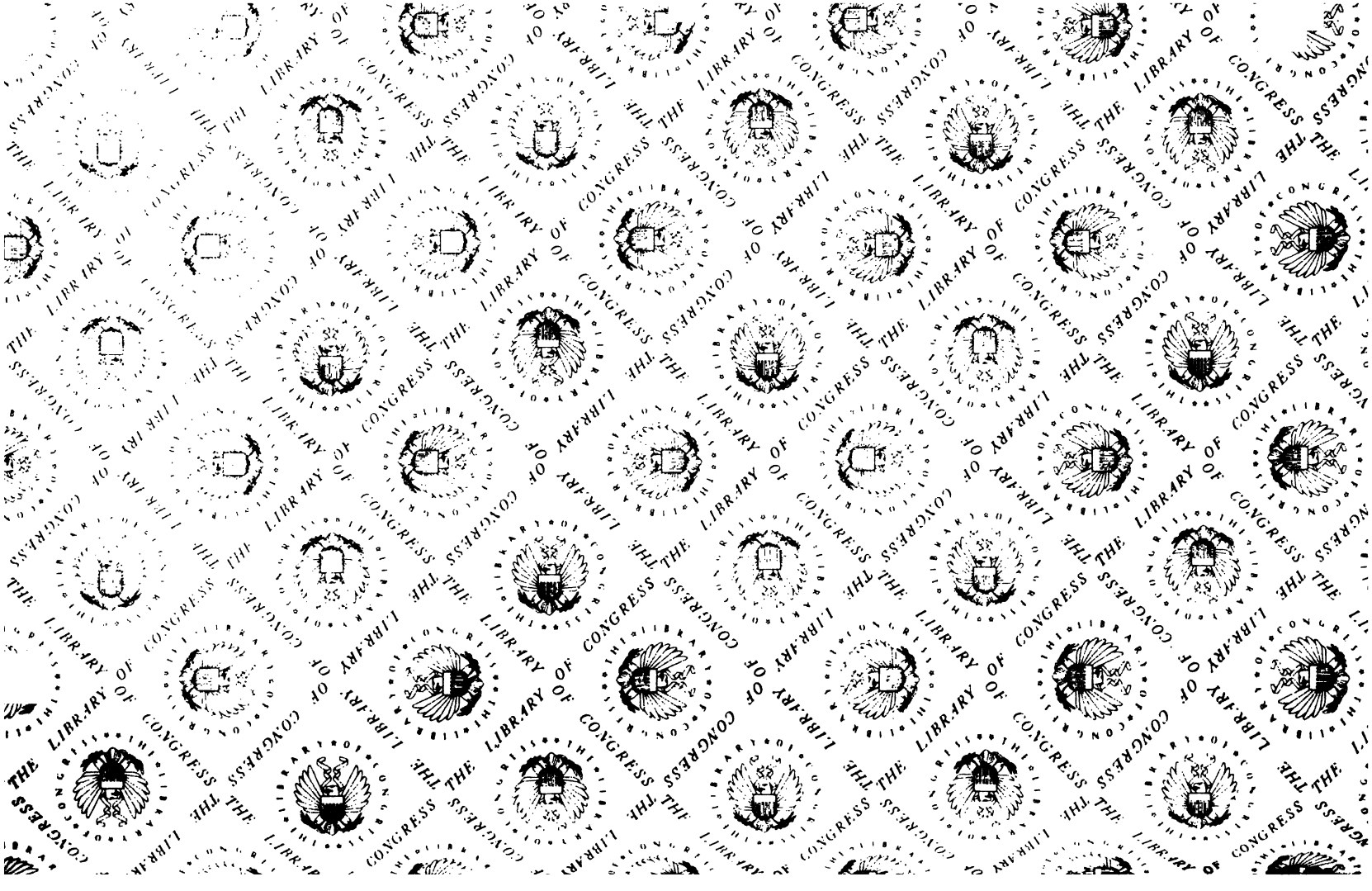
SALSIFY AND MACCARONI.

Stew the prepared Salsify fifteen minutes, then add half or two-thirds as much dry maccaroni (by bulk), stew gently half an hour longer, or until the ingredients are both of them perfectly tender, and the water pretty well done out. Remove from the fire, alt, and fill half full of sweet cream, or condensed milk. Cover and keep warm for ten minutes, then serve. This is really an elegant dish, finely developing the flavour of the "vegetable oyster," while the maccaroni is about as digestible as it can be anywhere —much more so than when baked with cheese.

At table, any of these dishes may be served with chicken, veal, &c.

The flavour of the Salsify is not sufficiently decided to make it of much value in soups.—*Julia Colman, Rural New Yorker.*

END OF VOL. VII.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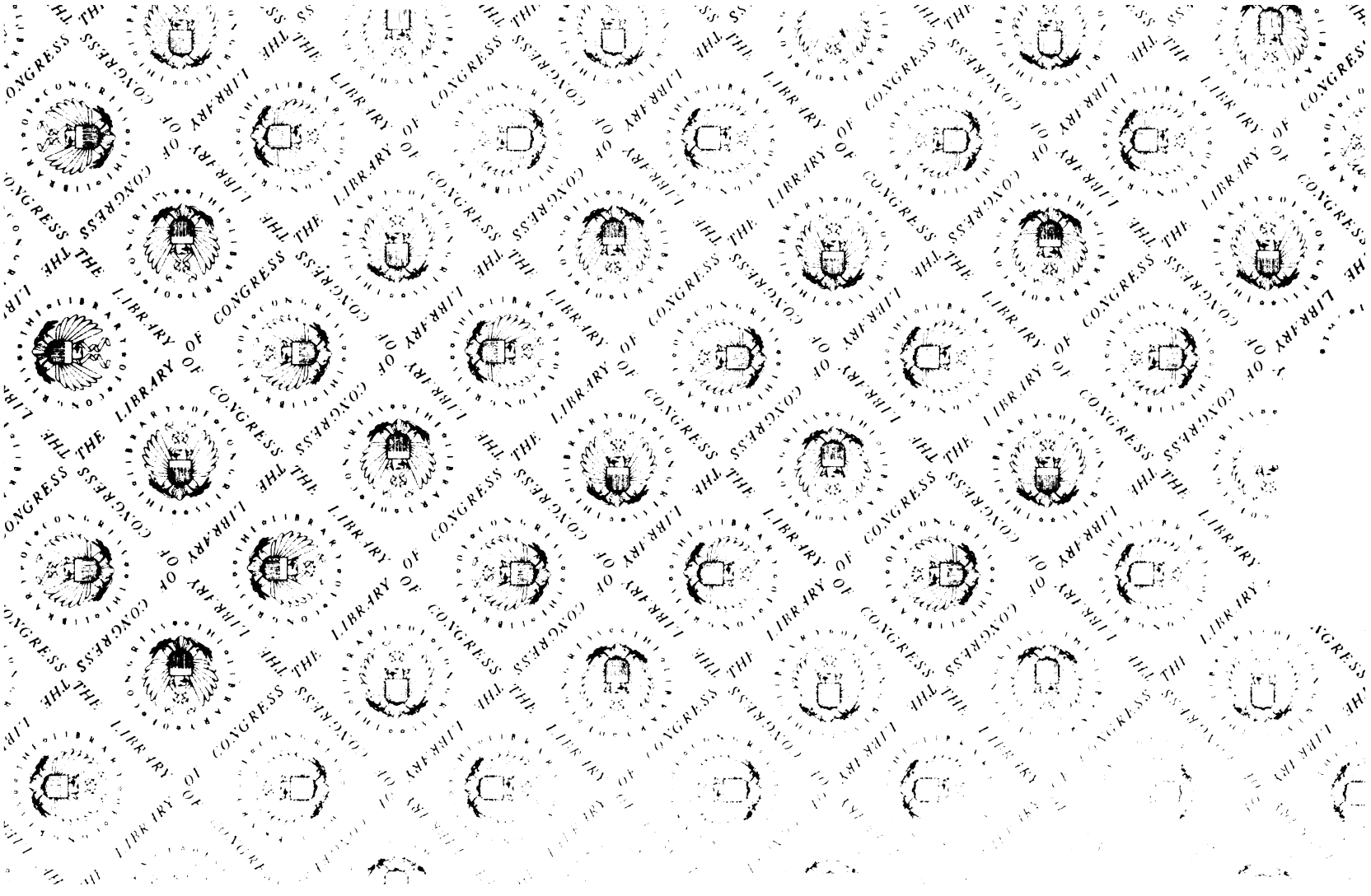
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